



welch

GC Column

Quality, Innovation, Competitive Price

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Outline of GC Column

Welch Materials have concentrated on GC R&D and production for many years, and each column would be tested strictly before selling with attached column report. Welch columns are characterized by stable properties, high column efficiency and good reproducibility. Welch Gas column can be divided into two types: WM Series High Performance GC Column and WEL Series Economical GC Column, which can meet the analysis requirements of various customers.

Welch also provides services as sample analysis, method development, column recommendation, after-sales support and training for customers.

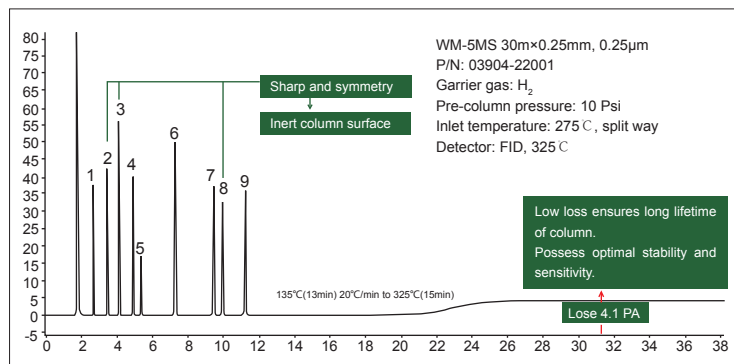
With good product performance and perfect after-sales service system, our GC columns have been widely used in universities, research institutes, pharmaceutical, petrochemical, brewing, environmental protection or other industries.

1.1 WM Series High Performance GC Column

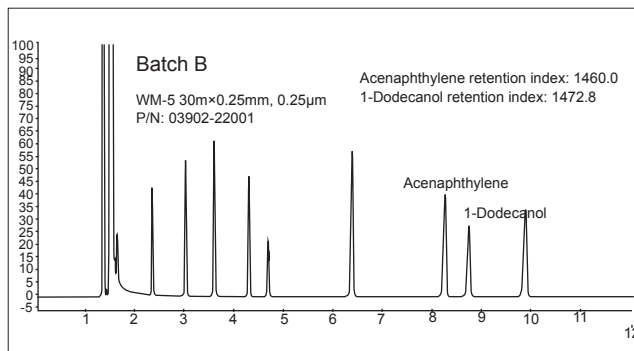
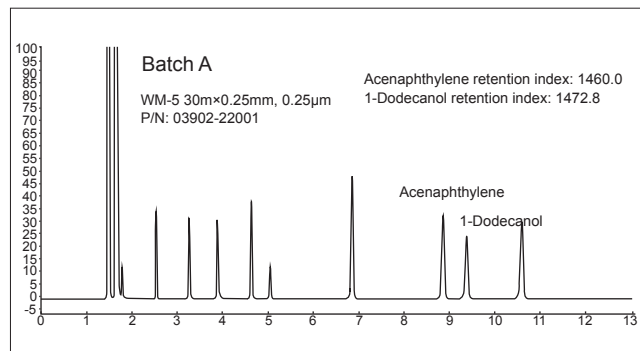
WM series of capillary columns adopt strict technique and performance detection with strength in super inertness, low loss, high column efficiency, high selectivity, stable reproducibility and long lifetime.

(1) Super Inertness and Low Loss GC/MS Column

- ▶ The unique surface deactivating technique ensures the super high inertness of column, and the peak type of separation component is sharp and symmetrical.
- ▶ Bonding and cross-linking technology allow the column to keep a low loss level at higher temperature with good stability and long lifetime.



(2) Exceptional lot-to-lot reproducibility

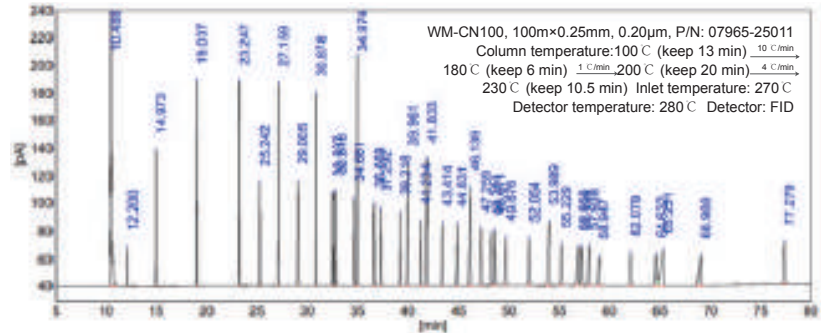


- ▶ The consistency of column inertness and superior inter-column reproducibility can be guaranteed by mixed standards samples test.
- ▶ Higher detection sensitivity and more accurate analysis results.

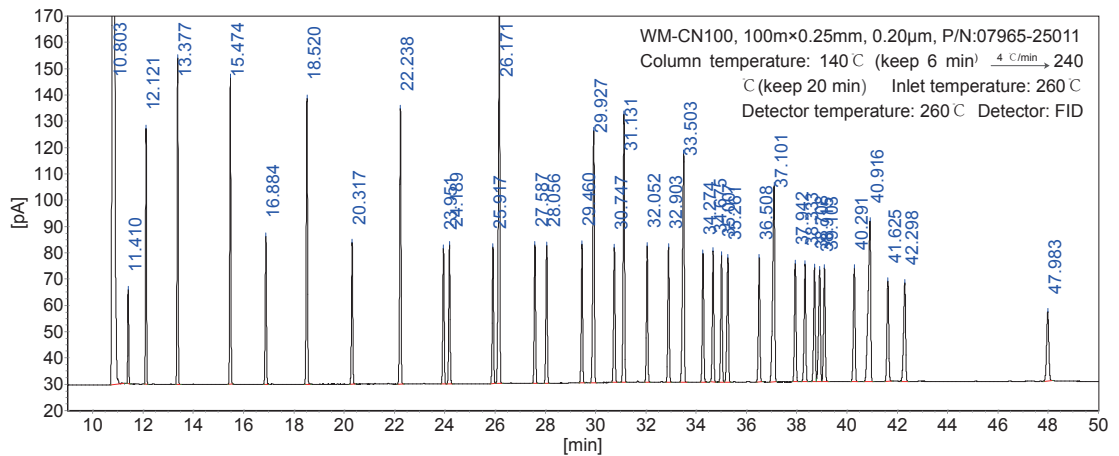
Case of Excellent Performance of WM Column

Determination of 37 fatty acids

Welch has released 37 fatty acid dedicated columns with excellent separation performance and reproducibility. Benefited from the optimized method, the analysis time can be greatly shortened without losing the resolution and the customer's analysis cost can be saved.



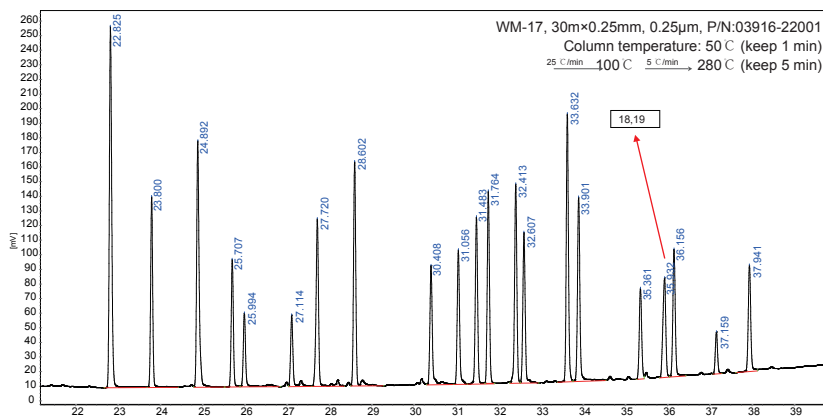
Method Optimization



Determination of 22 Kinds of Organochlorine Pesticide Residues

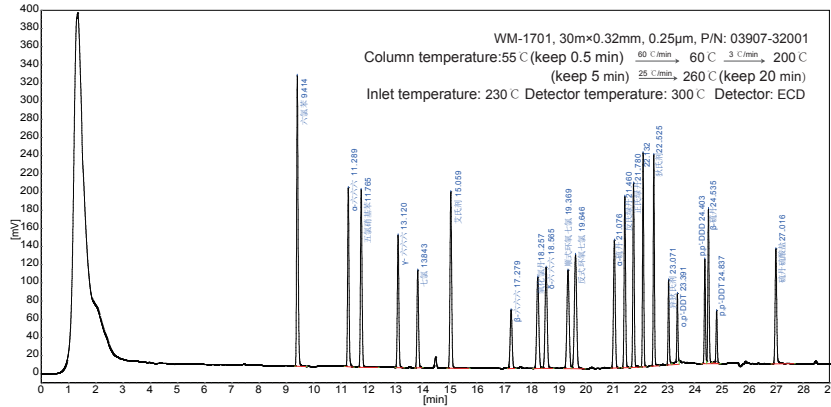
Welch provides an overall solution for the determination of 22 kinds of organochlorine pesticide residues, including sample pretreatment, chromatographic analysis, a complete set of products and technical support. The corresponding chromatographic analysis column and verification column are ideal substitution for named columns of the same specification.

P/N	Specification	Note
03916-22001	WM-17 30m×0.25mm, 0.25μm	Analysis column
03901-22001	WM-1 30m×0.25mm, 0.25μm	Verificaiton column



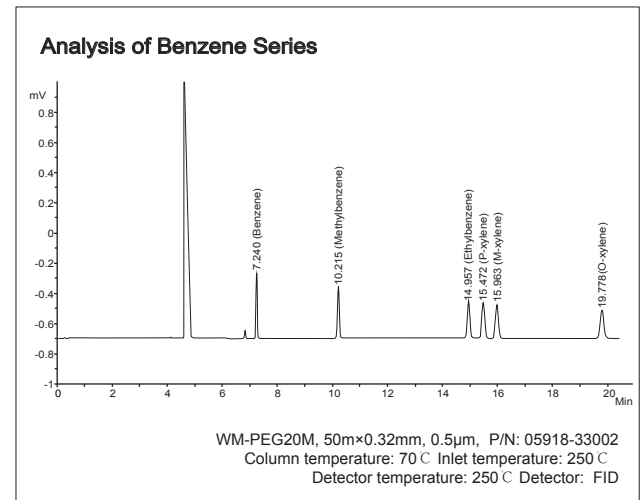
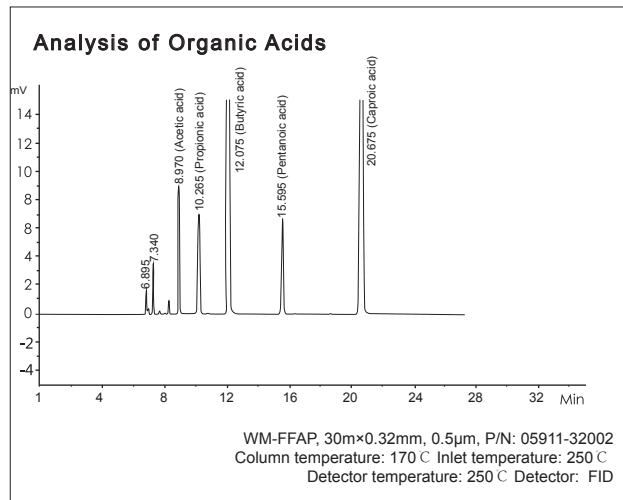
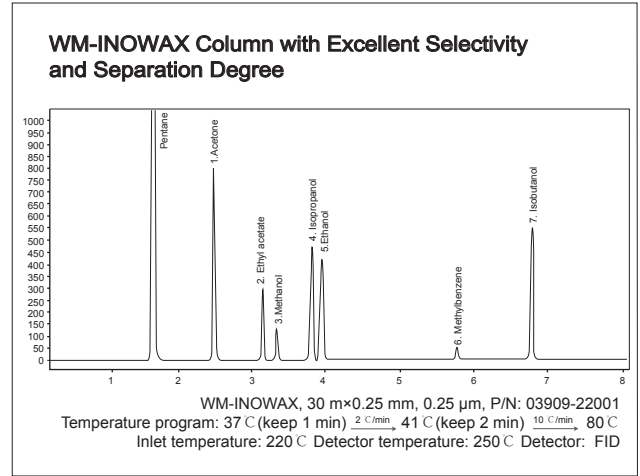
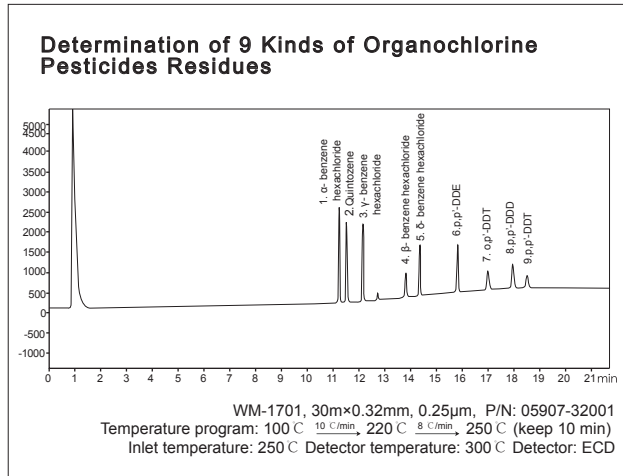
No.	Component	No.	Component
1	Hexachlorobenzene	12	Trans-chlordane
2	α- benzene hexachloride	13	Cis-chlordane
3	Quintozene	14	α-endosulfan
4	γ- benzene hexachloride	15	p,p'-DDE
5	β- benzene hexachloride	16	Dieldrin
6	Heptachlor	17	Endrin
7	δ- benzene hexachloride	18	o,p'-DDT+ p,p'-DDD
8	Aldrin	19	o,p'-DDT+ p,p'-DDD
9	Oxychlordane	20	β-endosulfan
10	Heptachlor epoxide	21	p,p'-DDT
11	Trans-heptachlor epoxide	22	Endosulfan sulfate

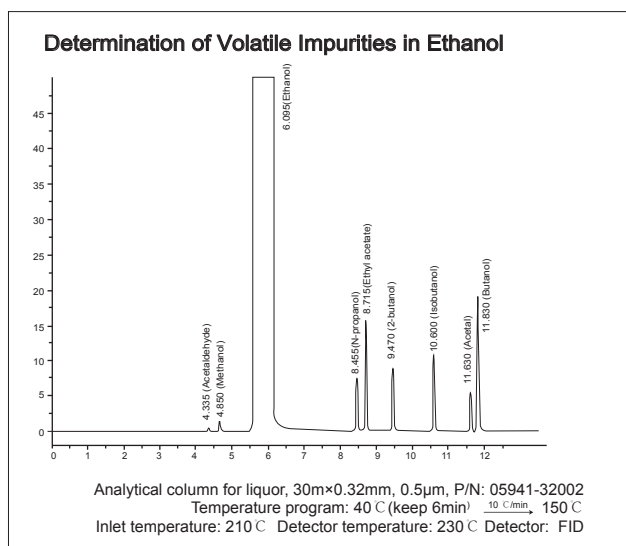
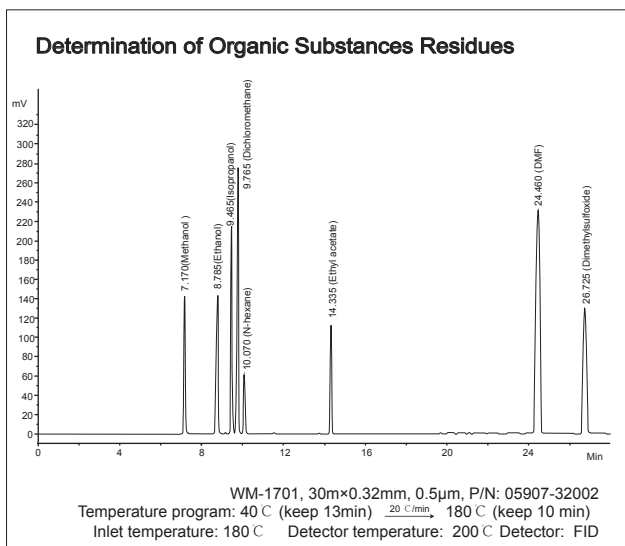
(Names of components in chromatogram are inferred according to files and experience)



No.	Component	No.	Component
1	Hexachlorobenzene	12	Trans-chlordane
2	α-benzene hexachloride	13	Cis-chlordane
3	Quintozene	14	α-endosulfan
4	γ-benzene hexachloride	15	p,p'-DDE
5	β-benzene hexachloride	16	Dieldrin
6	Heptachlor	17	Endrin
7	δ-benzene hexachloride	18	o,p'-DDT + p,p'-DDD
8	Aldrin	19	β-endosulfan
9	Oxychlorane	20	p,p'-DDT
10	Heptachlor epoxide	21	Endosulfan sulfate
11	Trans-heptachlor epoxide	22	

(Names of components in chromatogram are inferred according to files and experience)





Cross Reference

Stationary Liquid	USP	Similar Stationary Liquid
WM-1	G2	DB-1, HP-1, OV-1, BP-1, Rtx-1, OV-101, SPB-1, CP-Sil 5CB
WM-1MS	G2	DB-1MS, HP-1MS, OV-1MS, OV-1MS
WM-5	G27	BP-5, ZB-5, CP-Sil 8CB, DB-5, HP-5, SPB-5, Rtx-5, OV-5
WM-5MS	G27	ZB-5MS, DB-5MS, HP-5MS, OV-5MS
WM-35	G42	DB-35, HP-35, SPB-35, Rtx-35, PE-35, AT-35
WM-1301	G43	DB-1301, HP-1301, PE-1301, Rtx-1301
WM-1701	G46	BP-10, CB-1701, CP-Sil 19CB, DB-1701, Rtx-1701
WM-225	G7	007-225, DB-225, BP-225, HP-225, CP-Sil 43CB, Rtx-225
WM-624	G43	007-624, AT-624, CP-624, DB-624, HP-624, Rtx-502.2, VOCOL
WM-INOWAX	G16	CP-Wax, DB-Wax, HP-Innowax, PE-Wax, Rtx-Wax
WM-FFAP	G35	BP-21, HP-FFAP, PE-FFAP, CP-FFAP, DB-FFAP, Nukol
WM-17	G3	DB-17, HP-17, HP-50, Rtx-50, AT-50, SPB-50, SP-2250

Guideline of Selecting WM High Performance Series Capillary Column

WM Type	Stationary Phase Type	Polarity	Temp. limit (C)	Application Range
WM-1,WM-1MS	100% Dimethyl Polysiloxan	Nonpolarity	-60 to 325/350	Hydrocarbons, Aromatics, Pesticides, Phenols, Herbicides, Amines, Fatty Acid Methyl Esters, etc.
WM-5,WM-5MS	5% Phenyl, 95% Dimethyl Polysiloxane	Weak polarity	-60 to 325/350	Hydrocarbons, Aromatics, Pesticides, Herbicides, Drugs, Biodiesel, etc.
WM-1301	6% Cyanopropyl-phenyl, 94% Dimethyl Polysiloxane	Moderate polarity	-20 to 280/300	Alcohols, Pesticides, VOCs, iodines, Pesticide Residues, etc.
WM-35,WM-35MS	35% Phenyl, 65% Dimethyl Polysiloxane	Moderate polarity	40 to 300/320	Alcohols, Pesticides, Drugs
WM-17,WM-17MS	50% Phenyl, 50% Dimethyl Polysiloxane	Moderate polarity	40 to 300/320	Drugs, ethylene glycol, steroids, herbicides, pesticides
WM-1701	14% Cyanopropyl, 86% Dimethyl Polysiloxane	Moderate polarity	-20 to 280/300	Aromatic chlorine, insecticide, herbicide
WM-624	6% Cyanopropyl, 94% Dimethyl polysiloxane	Moderate polarity	-20 to 260	Solvent residual, volatile compounds
WM-225	50% Cyanopropyl, 50% Dimethyl polysiloxane	Moderate polarity	40 to 220/240	Neutral sterols, sugar alcohol acetate

WM Type	Stationary Phase Type	Polarity	Temp. limit (°C)	Application Range
WM-INOWAX	Polyethylene glycol	Strong polarity	40 to 260/280	Alcohols, Free Acids, Fatty Acid Methyl Esters, Polynuclears, Aromatics, Solvents, Essential Oils etc.
WM-FFAP	Polyethylene glycol modified by p-Phthalic acid	Strong polarity	50 to 260	Alcohols, Free Acids, Fatty Acid Methyl Esters, Aldehydes, Acrylic Esters, Ketones, etc.

WM High Performance Series Capillary Column WM-1, WM-1MS

- ▶ 100% Dimethyl polysiloxane stationary liquid
- ▶ General nonpolar stationary phase
- ▶ Thermal stability is up to 350°C
- ▶ Chemically bonded crosslinked columns can be flushed with solvent
- ▶ Polarity is similar to stationary phases of DB-1, SPB-1, HP-1, SE-30
- ▶ Comply with USP G2 specific stationary liquid
- ▶ As a kind of low-loss column, it can be used with MS detector

WM-1 capillary column which formed by the crosslink of 100% polydimethylsiloxane can separate samples by boiling point, so it is suitable in a wide range of temperature. Due to the covalent crosslinking method, WM-1 column is able to tolerate large injection volume while keeping a long lifetime.

Through a more rigorous manufacturing technique, WM-1MS capillary column has low loss rate. Before being a qualified product, each column needs to be strictly tested, which is assuring. With good inertness to active compounds, Ultra-low loss WM-1MS column can effectively improve the detection performance of MS, ECD and NPD.

WM-1 Ordering Information

Specification	P/N	Specification	P/N
WM-1 10m×0.18mm×0.18µm	03901-80018	WM-1 25m×0.2mm×0.33µm	03901-18021
WM-1 20m×0.18mm×0.18µm	03901-89018	WM-1 25m×0.2mm×0.5µm	03901-18002
WM-1 20m×0.18mm×0.36µm	03901-89028	WM-1 30m×0.25mm×0.1µm	03901-22007
WM-1 20m×0.18mm×0.4µm	03901-89022	WM-1 30m×0.25mm×0.25µm	03901-22001
WM-1 25m×0.2mm×0.11µm	03901-18029	WM-1 30m×0.25mm×0.5µm	03901-22002

Specification	P/N	Specification	P/N
WM-1 50m×0.32mm×0.17µm	03901-33030	WM-1 30m×0.2mm×0.5µm	05901-12002
WM-1 15m×0.2mm×0.25µm	05901-11001	WM-1 30m×0.25mm×0.25µm	05901-22001
WM-1 15m×0.2mm×0.5µm	05901-11002	WM-1 30m×0.25mm×0.5µm	05901-22002
WM-1 15m×0.25mm×0.25µm	05901-21001	WM-1 30m×0.32mm×0.25µm	05901-32001
WM-1 15m×0.25mm×0.5µm	05901-21002	WM-1 30m×0.32mm×0.5µm	05901-32002
WM-1 15m×0.32mm×0.25µm	05901-31001	WM-1 30m×0.32mm×1µm	05901-32003
WM-1 15m×0.32mm×0.5µm	05901-31002	WM-1 30m×0.53mm×0.5µm	05901-52002
WM-1 15m×0.53mm×0.5µm	05901-51002	WM-1 30m×0.53mm×1.0µm	05901-52003
WM-1 30m×0.2mm×0.25µm	05901-12001		

WM-1MS Ordering Information

Specification	P/N	Specification	P/N
WM-1MS 20m×0.18mm×0.18μm	03903-89018	WM-1MS 30m×0.25mm×1.0μm	03903-22003
WM-1MS 20m×0.18mm×0.36μm	03903-89028	WM-1MS 60m×0.25mm×0.25μm	03903-24001
WM-1MS 20m×0.18mm×0.4μm	03903-89022	WM-1MS 15m×0.32mm×0.25μm	03903-31001
WM-1MS 15m×0.20mm×0.33μm	03903-11021	WM-1MS 25m×0.32mm×0.52μm	03903-38024
WM-1MS 25m×0.20mm×0.33μm	03903-18021	WM-1MS 30m×0.32mm×0.1μm	03903-32007
WM-1MS 15m×0.25mm×0.25μm	03903-21001	WM-1MS 30m×0.32mm×0.25μm	03903-32001
WM-1MS 30m×0.25mm×0.1μm	03903-22007	WM-1MS 30m×0.32mm×1.0μm	03903-32003
WM-1MS 30m×0.25mm×0.25μm	03903-22001	WM-1MS 60m×0.32mm×0.25μm	03903-34001
WM-1MS 30m×0.25mm×0.5μm	03903-22002	WM-1MS 60m×0.32mm×1.0μm	03903-34003

WM-5,WM-54,WM-5MS

- ▶ 5% Diphenyl 95% dimethyl polysiloxane stationary liquid
- ▶ General low-polarity stationary phase
- ▶ Thermal stability is up to 350°C
- ▶ Chemically bonded crosslinked columns can be flushed with solvent
- ▶ Polarity is similar to stationary phases of DB-5, SPB-5, HP-5, Rtx-5
- ▶ Comply with USP G27 specific stationary liquid
- ▶ With low-loss, excellent inertness and high column efficiency,
- ▶ WM-5MS can be used with MS detector

Due to the addition of 5% diphenyl in polydimethylsiloxane, WM-5 column has higher polarity than WM-1 capillary column and has better selectivity to aromatic compounds. In most cases, it will be the type of column you first consider. Besides, WM-5 capillary column also has excellent reproducibility and high column efficiency.

Through a more rigorous manufacturing technique, WM-5MS capillary column has low loss rate. Before being a qualified product, each column needs to be strictly tested, which is assuring. With good inertness to active compounds, ultra-low loss WM-5MS column can effectively improve the detection performance of MS, ECD and NPD.

Specification	P/N	Specification	P/N
WM-5 30m×0.25mm×0.25μm	05902-22001	WM-5 50m×0.32m×0.5μm	05902-33002
WM-5 50m×0.25mm×0.25μm	05902-23001	WM-54 15m×0.2mm×0.25μm	05915-11001
WM-5 60m×0.25mm×0.5μm	05902-24002	WM-54 15m×0.25mm×0.25μm	05915-21001
WM-5 30m×0.32mm×0.25μm	05902-32001	WM-54 30m×0.25mm×0.25μm	05915-22001
WM-5 30m×0.32m×0.5μm	05902-32002	WM-54 30m×0.25mm×0.5μm	05915-22002

Specification	P/N	Specification	P/N
WM-54 50m×0.25mm×0.5μm	05915-23002	WM-5 10m×0.18mm×0.36μm	03902-80028
WM-54 30m×0.32mm×0.25μm	05915-32001	WM-5 10m×0.18mm×0.4μm	03902-80022
WM-54 30m×0.32mm×0.5μm	05915-32002	WM-5 20m×0.18mm×0.18μm	03902-89018
WM-54 30m×0.32mm×1.0μm	05915-32003	WM-5 20m×0.18mm×0.4μm	03902-89022
WM-54 30m×0.53mm×0.5μm	05915-52002	WM-5 25m×0.20mm×0.11μm	03902-18029
WM-54 30m×0.53mm×3.0μm	05915-52006	WM-5 25m×0.20mm×0.33μm	03902-18021
WM-5 10m×0.18mm×0.18μm	03902-80018		

Specification	P/N
WM-54 50m×0.25mm×0.5μm	05915-23002
WM-54 30m×0.32mm×0.25μm	05915-32001
WM-54 30m×0.32mm×0.5μm	05915-32002
WM-54 30m×0.32mm×1.0μm	05915-32003
WM-54 30m×0.53mm×0.5μm	05915-52002
WM-54 30m×0.53mm×3.0μm	05915-52006
WM-5 10m×0.18mm×0.18μm	03902-80018

Specification	P/N
WM-5 10m×0.18mm×0.36μm	03902-80028
WM-5 10m×0.18mm×0.4μm	03902-80022
WM-5 20m×0.18mm×0.18μm	03902-89018
WM-5 20m×0.18mm×0.4μm	03902-89022
WM-5 25m×0.20mm×0.11μm	03902-18029
WM-5 25m×0.20mm×0.33μm	03902-18021

WM-5MS Ordering Information:

Specification	P/N
WM-5MS 10m×0.1mm×0.1μm	03904-00007
WM-5MS 10m×0.18mm×0.18μm	03904-80018
WM-5MS 20m×0.18mm×0.18μm	03904-89018
WM-5MS 20m×0.18mm×0.36μm	03904-89028
WM-5MS 25m×0.20mm×0.33μm	03904-18021
WM-5MS 15m×0.25mm×0.1μm	03904-21007
WM-5MS 15m×0.25mm×0.25μm	03904-21001
WM-5MS 15m×0.25mm×0.5μm	03904-21002
WM-5MS 15m×0.25mm×1.0μm	03904-21003
WM-5MS 30m×0.25mm×0.1μm	03904-22007
WM-5MS 30m×0.25mm×0.25μm	03904-22001
WM-5MS 30m×0.25mm×0.5μm	03904-22002
WM-5MS 30m×0.25mm×1.0μm	03904-22003
WM-5MS 60m×0.25mm×0.1μm	03904-24007
WM-5MS 60m×0.25mm×0.25μm	03904-24001

Specification	P/N
WM-5MS 60m×0.25mm×0.5μm	03904-24002
WM-5MS 60m×0.25mm×1.0μm	03904-24003
WM-5MS 15m×0.32mm×0.1μm	03904-31007
WM-5MS 15m×0.32mm×0.25μm	03904-31001
WM-5MS 15m×0.32mm×0.5μm	03904-31002
WM-5MS 15m×0.32mm×1.0μm	03904-31003
WM-5MS 25m×0.32mm×0.52μm	03904-38024
WM-5MS 30m×0.32mm×0.1μm	03904-32007
WM-5MS,30m×0.32mm×0.25μm	03904-32001
WM-5MS 30m×0.32mm×0.5μm	03904-32002
WM-5MS 30m×0.32mm×1.0μm	03904-32003
WM-5MS 60m×0.32mm×0.1μm	03904-34007
WM-5MS 60m×0.32mm×0.25μm	03904-34001
WM-5MS 60m×0.32mm×0.5μm	03904-34002
WM-5MS 60m×0.32mm×1.0μm	03904-34003

WM-1301,WM-624

- ▶ 6% Cyanopropyl phenyl,94% dimethyl polysiloxane
- ▶ Comply with USP G43 specific stationary liquid
- ▶ It is specially used for the analysis of volatile organic compounds and residual solvents in drugs
- ▶ Bond and crosslink with medium polarity
- ▶ Has Excellent inertness for most compounds
- ▶ Temperature range: -20 to 260 C
- ▶ Polarity is similar to stationary phases of DB-624, SPB-1301, HP-624, Elite-1301, Rtx-624.
- ▶ WM-624 is specially designed for EPA method

WM-1301 Ordering Information:

Specification	P/N
WM-1301 15m×0.25mm×0.25μm	03905-21001
WM-1301 30m×0.25mm×0.25μm	03905-22001
WM-1301 30m×0.25mm×0.5μm	03905-22002

Specification	P/N
WM-1301 30m×0.25mm×1.0μm	03905-22003
WM-1301 60m×0.25mm×0.25μm	03905-24001
WM-1301 60m×0.25mm×1.0μm	03905-24003

Specification	P/N	Specification	P/N
WM-1301 60m×0.25mm×1.4μm	03905-24009	WM-1301 15m×0.32mm×0.5μm	05905-31002
WM-1301 15m×0.32mm×0.25μm	03905-31001	WM-1301 15m×0.53mm×0.5μm	05905-51002
WM-1301 15m×0.32mm×0.5μm	03905-31002	WM-1301 30m×0.2mm×0.25μm	05905-12001
WM-1301 30m×0.32mm×0.25μm	03905-32001	WM-1301 30m×0.2mm×0.5μm	05905-12002
WM-1301 30m×0.32mm×0.5μm	03905-32002	WM-1301 30m×0.25mm×0.25μm	05905-22001
WM-1301 30m×0.32mm×1.0μm	03905-32003	WM-1301 30m×0.25mm×0.5μm	05905-22002
WM-1301 15m×0.2mm×0.25μm	05905-11001	WM-1301 30m×0.25mm×1.4μm	05905-22009
WM-1301 15m×0.2mm×0.5μm	05905-11002	WM-1301 30m×0.32mm×0.25μm	05905-32001
WM-1301 15m×0.25mm×0.25μm	05905-21001	WM-1301 30m×0.32mm×0.5μm	05905-32002
WM-1301 15m×0.25mm×0.5μm	05905-21002	WM-1301 50m×0.2mm×0.5μm	05905-13002
WM-1301 30m×0.25mm×1μm	05905-22003	WM-1301 50m×0.25mm×0.25μm	05905-23001
WM-1301 15m×0.32mm×0.25μm	05905-31001		

WM-624 Ordering Information:

Specification	P/N	Product
WM-624 30m×0.25mm×1.4μm	03908-22009	GC capillary column
WM-624 60m×0.25mm×1.4μm	03908-24009	GC capillary column
WM-624 30m×0.32mm×0.25μm	03908-32001	GC capillary column
WM-624 30m×0.32mm×1.8μm	03908-32004	GC capillary column
WM-624 60m×0.32mm×1.8μm	03908-34004	GC capillary column
WM-624 30m×0.53mm×3.0μm	03908-52006	GC capillary column
WM-624 60m×0.53mm×3.0μm	03908-54006	GC capillary column
WM-624 60m×0.53mm×3.0μm	05908-54006	GC capillary column
WM-624 20m×0.18mm×1.0μm	03908-89003	GC capillary column
WM-624 75m×0.53mm×3.0μm	03908-512006	GC capillary column

WM-35,WM-35MS

- ▶ 35% Diphenyl 65% dimethyl polysiloxane stationary liquid
- ▶ General low-polarity stationary phase
- ▶ Thermal stability is up to 320 °C
- ▶ Chemically bonded crosslinked columns can be flushed with solvent
- ▶ Polarity is similar to stationary phases of DB-35, SPB-35, HP-35, Rtx-35, PE-35
- ▶ Comply with USP G42 specific stationary liquid
- ▶ As a kind of low-loss column, it can be used with MS detector

Due to the addition of 35% diphenyl in polydimethylsiloxane, WM-35 column is suitable for the analysis of compounds with medium polarity. Besides, WM-35 capillary column has excellent reproducibility and high column efficiency.

Through a more rigorous manufacturing technique, WM-35MS capillary has low loss rate. Before being a qualified product, each column needs to be strictly tested, which is assuring. With good inertness to active compounds, Ultra-low loss WM-35MS column can effectively improve the detection performance of MS, ECD and NPD.

WM-35 Ordering Information:

Specification	P/N
WM-35 20m×0.18mm×0.18μm	03921-89018
WM-35 15m×0.20mm×0.33μm	03921-11021
WM-35 25m×0.20mm×0.33μm	03921-18021
WM-35 30m×0.25mm×0.15μm	03921-22008
WM-35 30m×0.25mm×0.5μm	03921-22002
WM-35 60m×0.25mm×0.25μm	03921-24001
WM-35 60m×0.32mm×0.25μm	03921-24002
WM-35 15m×0.32mm×0.25μm	03921-31001

Specification	P/N
WM-35 30m×0.32mm×0.25μm	03921-32001
WM-35 30m×0.32mm×1.0μm	03921-32003
WM-35 60m×0.32mm×0.25μm	03921-34001
WM-35 60m×0.32mm×0.5μm	03921-34002
WM-35 30m×0.53mm×0.5μm	03921-52002
WM-35 30m×0.53mm×1.5μm	03921-52025
WM-35 60m×0.53mm×0.5μm	03921-54002

WM-35MS Ordering Information:

Specification	P/N
WM-35MS 20m×0.18mm×0.18μm	03906-89018
WM-35MS 15m×0.20mm×0.33μm	03906-11021
WM-35MS 25m×0.20mm×0.33μm	03906-18021
WM-35MS 15m×0.25mm×0.25μm	03906-21001
WM-35MS 30m×0.25mm×0.15μm	03906-22008
WM-35MS 30m×0.25mm×0.25μm	03906-22001

Specification	P/N
WM-35MS 60m×0.25mm×0.25μm	03906-24001
WM-35MS 15m×0.32mm×0.25μm	03906-31001
WM-35MS 30m×0.32mm×0.25μm	03906-32001
WM-35MS 30m×0.53mm×0.5μm	03906-52002
WM-35MS 30m×0.53mm×1.0μm	03906-52003

WM-17,WM-17MS

- ▶ 50% diphenyl 50% dimethyl polysiloxane
- ▶ General low-polarity stationary phase
- ▶ Thermal stability is up to 320 °C
- ▶ Chemically bonded crosslinked columns can be flushed with solvent
- ▶ Polarity is similar to stationary phases of DB-17, HP-17, SPB-50
- ▶ Comply with USP G3 specific stationary liquid
- ▶ Low-loss WM-17MS can be used with MS detector

Due to the addition of 50% diphenyl in polydimethylsiloxane, WM-17 column is suitable for the analysis of compounds with medium polarity. Besides, WM-17 capillary column has excellent reproducibility and high column efficiency.

Through a more rigorous manufacturing technique, WM-17 capillary column has low loss rate. Before being a qualified product, each column needs to be strictly tested, which is assuring. With good inertness to active compounds, ultra-low loss WM-17 column can effectively improve the detection performance of MS, ECD and NPD.

Specification	P/N
WM-17 20m×0.18mm×0.18μm	03916-89018
WM-17 20m×0.18mm×0.3μm	03916-89013
WM-17 15m×0.25mm×0.15μm	03916-21008
WM-17 15m×0.25mm×0.25μm	03916-21001
WM-17 15m×0.25mm×0.5μm	03916-21002
WM-17 30m×0.25mm×0.15μm	03916-22008
WM-17 30m×0.25mm×0.25μm	03916-22001

Specification	P/N
WM-17 15m×0.32mm×0.15μm	03916-31008
WM-17 15m×0.32mm×0.25μm	03916-31001
WM-17 15m×0.32mm×0.5μm	03916-31002
WM-17 30m×0.32mm×0.15μm	03916-32008
WM-17 30m×0.32mm×0.25μm	03916-32001
WM-17 60m×0.32mm×0.5μm	05916-34002
WM-17 30m×0.53mm×1.0μm	05916-52003

Specification	P/N
WM-17 30m×0.25mm×0.5μm	03916-22002
WM-17 60m×0.25mm×0.25μm	03916-24001

Specification	P/N
WM-17 30m×0.25mm×0.25μm	05916-22001
WM-17 30m×0.32mm×0.25μm	05916-32001

WM-17MS Ordering Information:

Specification	P/N
WM-17MS 20m×0.18mm×0.18μm	03947-89018
WM-17MS 15m×0.25mm×0.15μm	03947-21008
WM-17MS 15m×0.25mm×0.25μm	03947-21001
WM-17MS 30m×0.25mm×0.15μm	03947-22008
WM-17MS 30m×0.25mm×0.25μm	03947-22001
WM-17MS 60m×0.25mm×0.25μm	03947-24001

Specification	P/N
WM-17MS 15m×0.32mm×0.25μm	03947-31001
WM-17MS 30m×0.32mm×0.25μm	03947-32001
WM-17MS 60m×0.32mm×0.25μm	03947-34001
WM-17MS 30m×0.53mm×0.5μm	03947-52002
WM-17MS 15m×0.53mm×1.0μm	03947-51003

WM-1701

- ▶ 14% Cyanopropylphenyl 86% dimethyl polysiloxane
- ▶ General medium-polarity stationary phase
- ▶ Thermal stability is up to 300 C
- ▶ Chemically bonded crosslinked columns can be flushed with solvent
- ▶ Polarity is similar to stationary phases of DB-1701, SPB-1701, HP-1701
- ▶ Comply with USP G46 specific stationary liquid

WM-1701 Ordering Information:

Specification	P/N
WM-1701 30m×0.25mm×0.25μm	05907-22001
WM-1701 30m×0.25mm×0.5μm	05907-22002
WM-1701 15m×0.32mm×0.25μm	05907-31001
WM-1701 30m×0.32mm×0.25μm	05907-32001
WM-1701 30m×0.32mm×0.5μm	05907-32002
WM-1701 30m×0.32mm×2.65μm	05907-32034
WM-1701 50m×0.32mm×0.5μm	05907-33002
WM-1701 15m×0.53mm×0.5μm	05907-51002
WM-1701 20m×0.18mm×0.18μm	03907-89018
WM-1701 25m×0.20mm×0.2μm	03907-18011
WM-1701 15m×0.25mm×0.25μm	03907-21001
WM-1701 30m×0.25mm×0.25μm	03907-22001

Specification	P/N
WM-1701 30m×0.25mm×0.5μm	03907-22002
WM-1701 30m×0.25mm×1.0μm	03907-22003
WM-1701 60m×0.25mm×0.25μm	03907-24001
WM-1701 60m×0.25mm×0.5μm	03907-24002
WM-1701 15m×0.32mm×0.25μm	03907-31001
WM-1701 15m×0.32mm×0.5μm	03907-31002
WM-1701 30m×0.32mm×0.25μm	03907-32001
WM-1701 30m×0.32mm×0.5μm	03907-32002
WM-1701 30m×0.32mm×1.0μm	03907-32003
WM-1701 60m×0.32mm×0.25μm	03907-34001
WM-1701 60m×0.32mm×0.5μm	03907-34002
WM-1701 60m×0.32mm×1.0μm	03907-34003

WM-225

- ▶ 50% Cyanopropylphenyl, 50% dimethyl polysiloxane
- ▶ Bonded crosslinked column
- ▶ Thermal stability is up to 240°C
- ▶ Equivalent to USP stationary G7
- ▶ Stationary phase with medium polarity, suitable for separation of Cis or trans fatty acid methyl ester
- ▶ Polarity is similar to DB-225, HP-225, Rtx-225

WM-225 Ordering Information:

Specification	P/N	Product
WM-225 30m×0.53mm×1.0μm	05919-52003	GC capillary column

WM-INOWAX

- ▶ Bonded crosslinked polyethylene glycol (PEG)
- ▶ General stationary phase with polarity
- ▶ With antioxidant properties
- ▶ Thermal stability is up to 280 °C
- ▶ Chemically bonded crosslinked columns can be flushed with solvent
- ▶ Polarity is similar to stationary phases of HP-INNOWax, CP-WAX 52CB
- ▶ Comply with USP G16 specific stationary liquid

WM-INOWAX Ordering Information

Specification	P/N	Specification	P/N
WM-INOWAX 10m×0.18mm×0.18μm	03909-80018	WM-INOWAX 60m×0.25mm×0.5μm	03909-24002
WM-INOWAX 20m×0.18mm×0.18μm	03909-89018	WM-INOWAX 15m×0.32mm×0.25μm	03909-31001
WM-INOWAX 25m×0.20mm×0.2μm	03909-18011	WM-INOWAX 15m×0.32mm×0.5μm	03909-31002
WM-INOWAX 25m×0.20mm×0.4μm	03909-18022	WM-INOWAX 30m×0.32mm×0.15μm	03909-32008
WM-INOWAX 50m×0.20mm×0.2μm	03909-13011	WM-INOWAX 30m×0.32mm×0.25μm	03909-32001
WM-INOWAX 50m×0.20mm×0.4μm	03909-13022	WM-INOWAX 30m×0.32mm×0.5μm	03909-32002
WM-INOWAX 15m×0.25mm×0.25μm	03909-21001	WM-INOWAX 30m×0.32mm×1.0μm	03909-32003
WM-INOWAX 15m×0.25mm×0.5μm	03909-21002	WM-INOWAX 60m×0.32mm×0.15μm	03909-34008
WM-INOWAX 30m×0.25mm×0.15μm	03909-22008	WM-INOWAX 30m×0.53mm×1.0μm	03909-52003
WM-INOWAX 30m×0.25mm×0.25μm	03909-22001	WM-INOWAX 60m×0.53mm×0.5μm	03909-54002
WM-INOWAX 30m×0.25mm×0.5μm	03909-22002	WM-INOWAX 50m×0.53mm×2.0μm	05909-53005
WM-INOWAX 60m×0.25mm×0.15μm	03909-24008	WM-INOWAX 30m×0.25mm×0.25μm	05909-22001
WM-INOWAX 60m×0.25mm×0.25μm	03909-24001		

WM-FFAP

- ▶ Nitroterephthalic acid modified polyethylene glycol
- ▶ Stationary phase has strong polarity
- ▶ Has special advantages in the analysis of volatile fatty acids and phenol and other substances
- ▶ Thermal stability is up to 260 °C
- ▶ Polarity is similar to stationary phases of DB-FFAP, HP-FFAP, Stabilwax-DA
- ▶ Comply with USP G35 specific stationary liquid

WM-FFAP Ordering Information

Specification	P/N	Specification	P/N
WM-FFAP 30m×0.20mm×0.25μm	05911-12001	WM-FFAP 50m×0.20mm×0.3μm	03911-13013
WM-FFAP 30m×0.25mm×0.25μm	05911-22001	WM-FFAP 15m×0.25mm×0.25μm	03911-21001
WM-FFAP 60m×0.25mm×0.25μm	05911-24001	WM-FFAP 30m×0.25mm×0.25μm	03911-22001
WM-FFAP 30m×0.32mm×0.25μm	05911-32001	WM-FFAP 30m×0.20mm×0.25μm	03911-12001
WM-FFAP 30m×0.32mm×0.5μm	05911-32002	WM-FFAP 50m×0.25mm×0.25μm	03911-23001
WM-FFAP 30m×0.32mm×1.0μm	05911-32003	WM-FFAP 15m×0.32mm×0.25μm	03911-31001

Specification	P/N
WM-FFAP 30m×0.53mm×0.5μm	05911-52002
WM-FFAP 30m×0.53mm×1.0μm	05911-52003
WM-FFAP 20m×0.18mm×0.18μm	03911-89018
WM-FFAP 25m×0.20mm×0.3μm	03911-18013

Specification	P/N
WM-FFAP 25m×0.32mm×0.5μm	03911-38002
WM-FFAP 30m×0.32mm×0.25μm	03911-32001
WM-FFAP 30m×0.32mm×0.5μm	03911-32002
WM-FFAP 30m×0.32mm×1.0μm	03911-32003

Specification	P/N
WM-FFAP 50m×0.32mm×0.5μm	03911-33002
WM-FFAP 60m×0.32mm×0.25μm	03911-34001

Specification	P/N
WM-FFAP 10m×0.53mm×1.0μm	03911-50003

1.2 WEL Series Economical GC Column

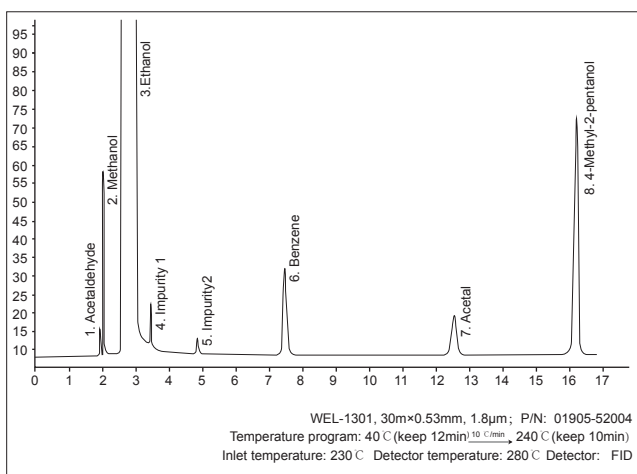
Each of the WEL series of capillary columns has been strictly tested with attached evaluation chromatogram. For high column efficiency and sensitivity, our products are popular among new and regular customers. We can provide sample analysis for customers to ensure the superior performance of columns and various dedicated columns for some test items with higher column efficiency and separation effect, which can help in the qualitative and quantitative analysis.

Sample analysis flow

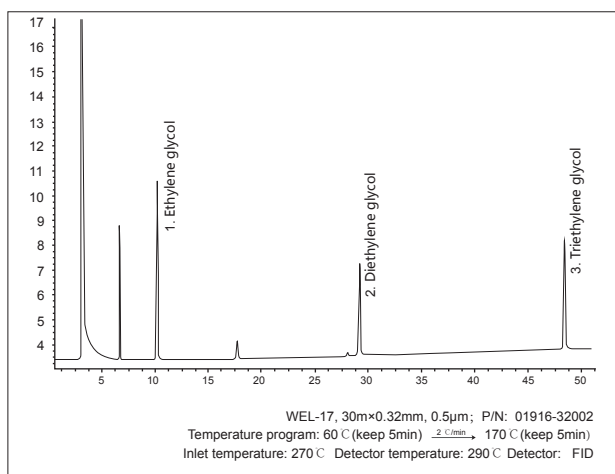


Chromatogram of Typical Applications

1. Detection of Volatile Impurities in Ethanol

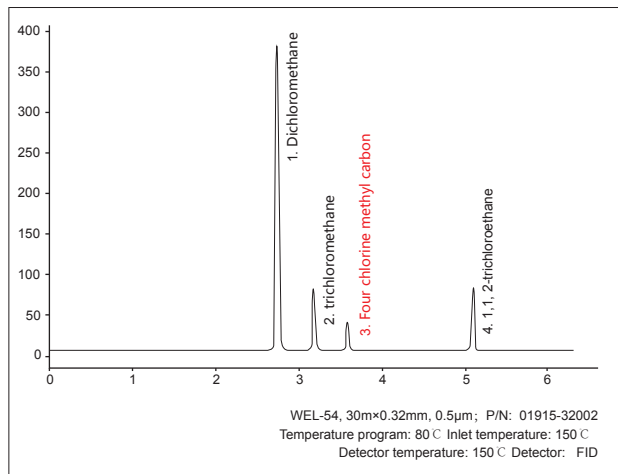
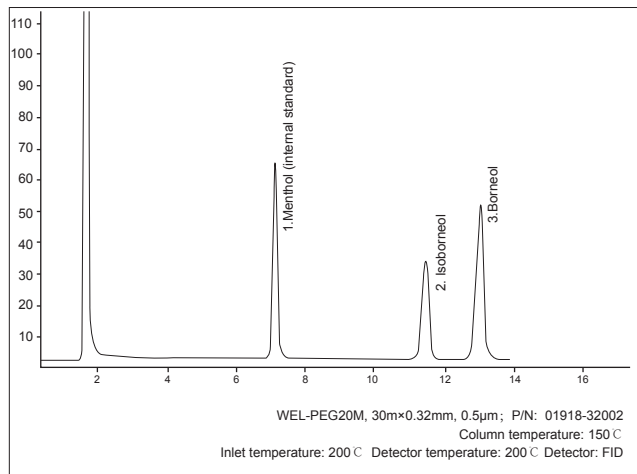


2. Detection of Ethylene Glycol, Diethylene Glycol and Triethylene Glycol in Polyethylene Glycol 400

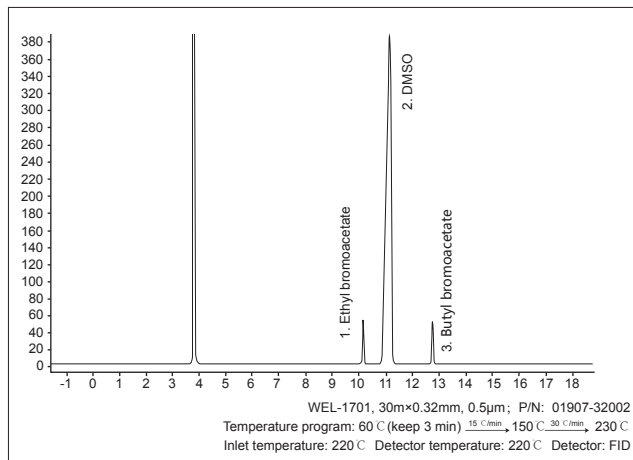


3) Determination of Effective Composition of Borneol

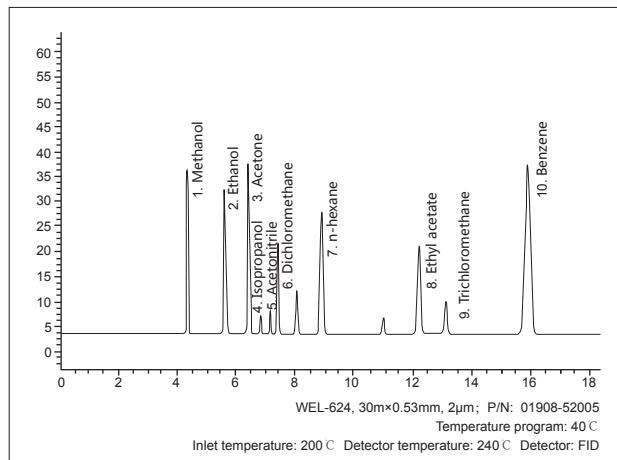
4) Analysis of Chloroalkanes



5) Determination of Ethyl Bromoacetate



6) Determination of Organic Solvent Residue



Ordering Information

Specification	P/N
WEL-1 30m×0.25mm×0.25μm	01901-22001
WEL-1 30m×0.25mm×0.5μm	01901-22002
WEL-1 30m×0.25mm×1.0μm	01901-22003
WEL-1 50m×0.25mm×0.25μm	01901-23001
WEL-1 50m×0.25mm×0.5μm	01901-23002
WEL-1 50m×0.25mm×1.0μm	01901-23003
WEL-1 60m×0.25mm×0.25μm	01901-24001
WEL-1 60m×0.25mm×0.5μm	01901-24002
WEL-1 60m×0.25mm×1.0μm	01901-24003
WEL-5 30m×0.32mm×0.25μm	01902-32001
WEL-5 30m×0.32mm×0.5μm	01902-32002
WEL-5 30m×0.32mm×1.0μm	01902-32003
WEL-5 30m×0.32mm×3.0μm	01902-32006

Specification	P/N
WEL-1701 50m×0.25mm×0.25μm	01907-23001
WEL-1701 50m×0.25mm×0.5μm	01907-23002
WEL-1701 50m×0.25mm×1.0μm	01907-23003
WEL-1701 60m×0.25mm×0.25μm	01907-24001
WEL-1701 60m×0.25mm×0.5μm	01907-24002
WEL-624 30m×0.25mm×0.25μm	01908-22001
WEL-624 30m×0.25mm×0.5μm	01908-22002
WEL-624 30m×0.25mm×1.0μm	01908-22003
WEL-624 30m×0.25mm×1.4μm	01908-22004
WEL-624 50m×0.25mm×0.25μm	01908-23001
WEL-624 50m×0.25mm×0.5μm	01908-23002
WEL-624 50m×0.25mm×1.0μm	01908-23003
WEL-624 60m×0.25mm×0.25μm	01908-24001

Specification	P/N
WEL-5 15m×0.53mm×1.0μm	01902-51003
WEL-5 30m×0.53mm×1.0μm	01902-52003
WEL-5 50m×0.53mm×1.0μm	01902-53003
WEL-1301 60m×0.25mm×1.8μm	01905-24004
WEL-1301 30m×0.32mm×1.8μm	01905-32004
WEL-1301 30m×0.53mm×1.8μm	01905-52004
WEL-1301 50m×0.53mm×2.0μm	01905-53005
WEL-1301 30m×0.53mm×2.0μm	01905-52005
WEL-1701 30m×0.25mm×0.25μm	01907-22001
WEL-1701 30m×0.25mm×0.5μm	01907-22002
WEL-1701 30m×0.25mm×1.0μm	01907-22003

Specification	P/N
WEL-624 60m×0.25mm×0.5μm	01908-24002
WEL-624 60m×0.25mm×1.0μm	01908-24003
WEL-624 25m×0.25mm×0.2μm	01908-28011
WEL-624 30m×0.32mm×0.25μm	01908-32001
WEL-624 30m×0.32mm×0.5μm	01908-32002
WEL-FFAP 30m×0.25mm×0.25μm	01911-22001
WEL-FFAP 30m×0.25mm×0.5μm	01911-22002
WEL-FFAP 30m×0.25mm×1.0μm	01911-22003
WEL-FFAP 50m×0.25mm×0.5μm	01911-23002
WEL-FFAP 50mm×0.25mm×1.0μm	01911-23003
WEL-FFAP 60m×0.25mm×0.25μm	01911-24001

Specification	P/N
WEL-FFAP 60m×0.25mm×0.5μm	01911-24002
WEL-FFAP 60m×0.25mm×1.0μm	01911-24003
WEL-FFAP 30m×0.32mm×0.25μm	01911-32001
WEL-FFAP 30m×0.32mm×0.5μm	01911-32002
WEL-FFAP 30m×0.32mm×1.0μm	01911-32003
WEL-FFAP 50m×0.32mm×0.25μm	01911-33001
WEL-FFAP 50m×0.32mm×0.5μm	01911-33002
WEL-FFAP 50m×0.32mm×1.0μm	01911-33003
WEL-30 30m×0.25mm×0.25μm	01912-22001
WEL-30 30m×0.25mm×0.5μm	01912-22002
WEL-30 30m×0.25mm×1.0μm	01912-22003
WEL-30 50m×0.25mm×0.25μm	01912-23001
WEL-30 50m×0.25mm×0.5μm	01912-23002
WEL-30 50m×0.25mm×1.0μm	01912-23003
WEL-30 60m×0.25mm×0.25μm	01912-24001
WEL-30 60m×0.25mm×0.5μm	01912-24002
WEL-30 60m×0.25mm×1.0μm	01912-24003
WEL-30 30m×0.32mm×0.25μm	01912-32001
WEL-30 30m×0.32mm×0.5μm	01912-32002

Specification	P/N
WEL-30 30m×0.32mm×1.0μm	01912-32003
WEL-30 50m×0.32mm×0.25μm	01912-33001
WEL-101 30m×0.25mm×0.25μm	01913-22001
WEL-101 30m×0.25mm×0.5μm	01913-22002
WEL-101 30m×0.25mm×1.0μm	01913-22003
WEL-101 50m×0.25mm×0.25μm	01913-23001
WEL-101 50m×0.25mm×0.5μm	01913-23002
WEL-101 50m×0.25mm×1.0μm	01913-23003
WEL-101 60m×0.25mm×0.25μm	01913-24001
WEL-101 60m×0.25mm×0.5μm	01913-24002
WEL-101 60m×0.25mm×1.0μm	01913-24003
WEL-101 30m×0.32mm×0.25μm	01913-32001
WEL-101 30m×0.32mm×0.5μm	01913-32002
WEL-101 30m×0.32mm×1.0μm	01913-32003
WEL-101 50m×0.32mm×0.25μm	01913-33001
WEL-101 50m×0.32mm×0.5μm	01913-33002
WEL-52 30m×0.32mm×0.25μm	01914-32001
WEL-54 50m×0.25mm×0.25μm	01915-23001
WEL-54 50m×0.25mm×0.5μm	01915-23002

Specification	P/N
WEL-17 50m×0.25mm×1.0μm	01916-23003
WEL-17 60m×0.25mm×0.25μm	01916-24001
WEL-17 60m×0.25mm×0.5μm	01916-24002
WEL-54 60m×0.25mm×1.0μm	01915-24003

Specification	P/N
WEL-XE60 50m×0.32mm×0.5μm	01917-33002
WEL-XE60 50m×0.32mm×1.0μm	01917-33003
WEL-225 30m×0.25mm×0.25μm	01919-22001
WEL-17 30m×0.32mm×1.0μm	01916-32003

Specification	P/N
WEL-54 30m×0.32mm×0.25μm	01915-32001
WEL-54 30m×0.32mm×0.5μm	01915-32002
WEL-54 30m×0.32mm×1.0μm	01915-32003
WEL-54 50m×0.32mm×0.25μm	01915-33001
WEL-54 50m×0.32mm×0.5μm	01915-33002
WEL-54 50m×0.32mm×1.0μm	01915-33003
WEL-17 30m×0.25mm×0.25μm	01916-22001
WEL-17 30m×0.25mm×0.5μm	01916-22002
WEL-17 30m×0.25mm×1.0μm	01916-22003
WEL-17 50m×0.25mm×0.25μm	01916-23001
WEL-17 50m×0.25mm×0.5μm	01916-23002
WEL-17 50m×0.25mm×1.0μm	01916-23003
WEL-17 60m×0.25mm×0.25μm	01916-24001
WEL-17 60m×0.25mm×0.5μm	01916-24002

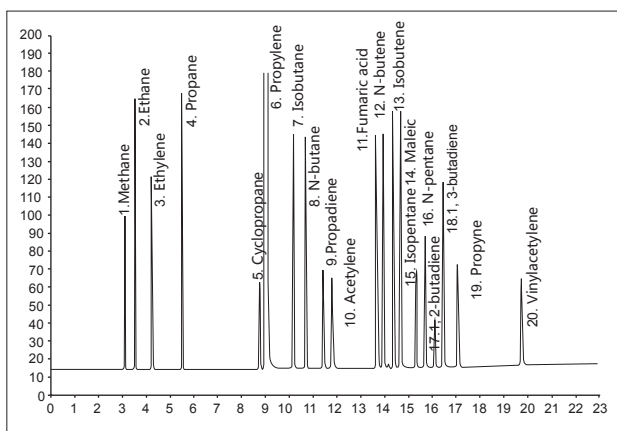
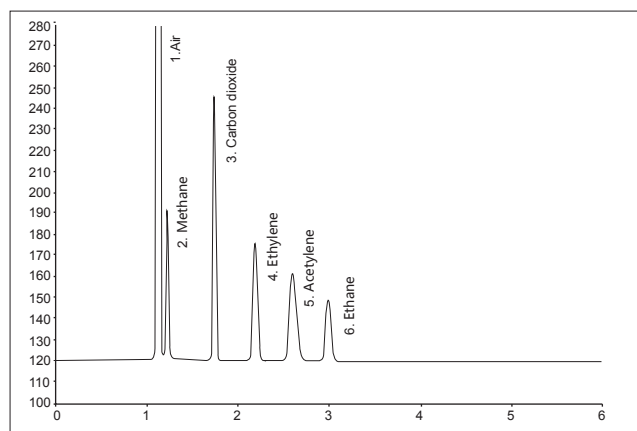
Specification	P/N
WEL-XE60 30m×0.25mm×0.25μm	01917-22001
WEL-XE60 30m×0.25mm×0.5μm	01917-22002
WEL-XE60 30m×0.25mm×1.0μm	01917-22003
WEL-XE60 50m×0.25mm×0.25μm	01917-23001
WEL-XE60 50m×0.25mm×0.5μm	01917-23002
WEL-XE60 60m×0.25mm×0.25μm	01917-24001
WEL-XE60 60m×0.25mm×0.5μm	01917-24002
WEL-XE60 60m×0.25mm×1.0μm	01917-24003
WEL-XE60 30m×0.32mm×0.5μm	01917-32002
WEL-XE60 30m×0.32mm×1.0μm	01917-32003
WEL-XE60 50m×0.32mm×0.25μm	01917-33001
WEL-XE60 50m×0.32mm×0.5μm	01917-33002
WEL-XE60 50m×0.32mm×1.0μm	01917-33003
WEL-225 30m×0.25mm×0.25μm	01919-22001

Specification	P/N
WEL-225 30m×0.25mm×0.5μm	01919-22002
WEL-225 30m×0.25mm×1.0μm	01919-22003
WEL-225 50m×0.25mm×0.25μm	01919-23001
WEL-225 50m×0.25mm×0.5μm	01919-23002
WEL-225 50m×0.25mm×1.0μm	01919-23003
WEL-225 60m×0.25mm×0.25μm	01919-24001
WEL-225 60m×0.25mm×0.5μm	01919-24002

Specification	P/N
WEL-225 60m×0.25mm×1.0μm	01919-24003
WEL-225 30m×0.32mm×0.25μm	01919-32001
WEL-225 30m×0.32mm×0.5μm	01919-32002
WEL-225 30m×0.32mm×1.0μm	01919-32003
WEL-35 30m×0.25mm×0.25mm	01921-22001
WEL-35 30m×0.32mm×0.25μm	01921-32001
WEL-35 30m×0.20mm×0.25mm	01921-12001

PLOT Column

PLOT column has small granular material bonded on the pipe wall. Welch provides high quality PLOT columns which applied the unique integrated synthesis technology. Commonly used PLOT column stationary phases include styrene and its derivatives, molecular sieves and alumina, which are suitable for the separation and analysis of permanent gas and low molecular weight hydrocarbon isomers.



WEL-PLOT Q, 30m×0.53mm, 40µm; P/N: 06928-52026
 Column temperature: 35 °C
 Inlet temperature: 250 °C Detector temperature: 250 °C Detector: TCD

WEL-PLOT Al₂O₃, 50m×0.53mm, 25µm; P/N: 06946-53027
 Temperature program: 80 °C (keep 5 min) → 180 °C
 Inlet temperature: 250 °C Detector temperature: 250 °C Detector: FID

PLOT Capillary Column

Use Alumina as the stationary phase, alumina columns can be divided into the following three kinds according to the surface treatment of alumina.

- ▶ WEL-PLOT Al₂O₃/KCL (Modified KCl)
- ▶ WEL-AL₂O₃/S (Na₂SO₄)
- ▶ WEL-AL₂O₃/M (Modified Na₂MoO₄)
- ▶ Polarity is similar to GS-Alumina, HP PLOT S, HP PLOT M, Alumina-PLOT, AT-Alumina, CP-Al₂O₃/Na₂SO₄

Use divinylbenzene - polystyrene as the stationary phase

Used for analysis of alkanes, methane, air/carbon monoxide, oxides and sulfides of C1-C3 isomers, to C12.

- ▶ PLOT Q

Use molecular sieve as the stationary phase (Carbon molecular sieve, 5A molecular sieve)

Mainly used for the detection of permanent gases, such as nitrogen, oxygen, carbon monoxide, methane and other gases.

- ▶ WEL-PLOT Molesieve

PLOT Column Ordering Information

Specification	P/N
WEL-PLOT Q 30m×0.32mm×20µm	06928-32014
WEL-PLOT Q 30m×0.32mm×10µm	06928-32040

Specification	P/N
WEL-PLOT Q 30m×0.53mm×20µm	06928-52014
WEL-PLOT Q 30m×0.53mm×40µm	06928-52026

Specification	P/N
WEL-PLOT Al ₂ O ₃ /S 50m×0.53mm×25µm	06951-53027
WEL-PLOT Al ₂ O ₃ /M 50m×0.53mm×0.25µm	06952-53001
WEL-PLOT Q 30m×0.53mm×25µm	06928-52027
WEL-PLOT Al ₂ O ₃ /S 30m×0.53mm×20µm	01951-52020

Specification	P/N
WEL-PLOT Al ₂ O ₃ /S 30m×0.53mm×20µm	05951-52020
WEL-PLOT Al ₂ O ₃ /S 50m×0.53mm×20µm	05951-53020
WEL-PLOT Al ₂ O ₃ /S 50m×0.32mm×8µm	01951-33037

1.3 Dedicated Capillary Column

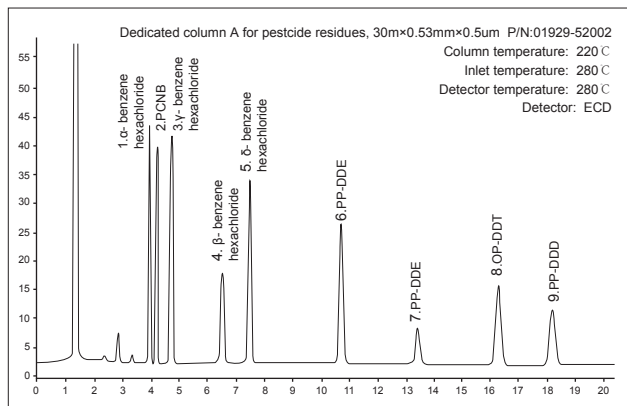
For separation problem of some complex samples, Welch developed the dedicated column which can be applied to pesticide analysis, volatile organic compounds analysis, petrochemical analysis, liquor analysis and other aspects with unique performance. It requires short analysis time with good separation effect, and it is convenient for better qualitative and quantitative analysis.

P/N	Product	Length×Inner Size×Membrane m×mm×µm	Application
01929-32002	Dedicated column A for pesticide residues	30m×0.32mm×0.5µm	Organochlorine pesticide
01929-52002		30m×0.53mm×0.5µm	
01937-32002	Dedicated column B for pesticide residues	30m×0.32mm×0.5µm	Organophosphorus pesticide
01937-52002		30m×0.53mm×0.5µm	
01932-22023	BPX-70	30m×0.25mm×0.22µm	Analysis of evening primrose oil
05935-33003	TVOC dedicated column	50m×0.32mm×1.0µm	Total volatile organic compounds (VOCs) in indoor air

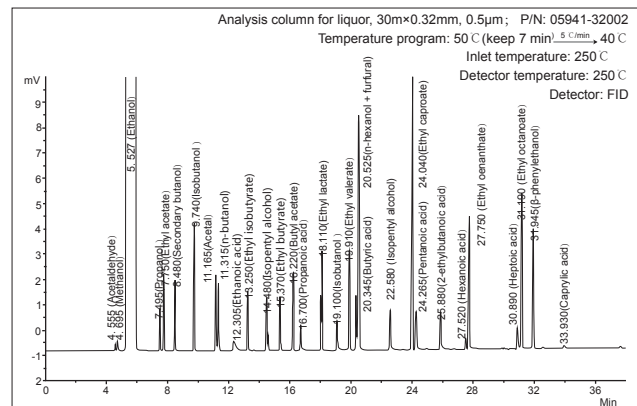
P/N	Product	Length×Inner Size×Membrane m×mm×μm	Application
01936-13002	PONA dedicated column	50m×0.20mm×0.5μm	Analysis of gasoline and diesel component
01936-23002		50m×0.25mm×0.5μm	
05941-32002	Dedicated column for wine analysis	30m×0.32mm×0.5μm	Composition analysis of liquor and beer

P/N	Product	Length×Inner Size×Membrane m×mm×μm	Application
01929-32002	Dedicated column A for pesticide residues	30m×0.32mm×0.5μm	Organochlorine pesticide
01929-52002		30m×0.53mm×0.5μm	
01937-32002	Dedicated column B for pesticide residues	30m×0.32mm×0.5μm	Organophosphorus pesticide
01937-52002		30m×0.53mm×0.5μm	
01932-22023	BPX-70	30m×0.25mm×0.22μm	Analysis of evening primrose oil
05935-33003	TVOC dedicated column	50m×0.32mm×1.0μm	Total volatile organic compounds (VOCs) in indoor air
01936-13002	PONA dedicated column	50m×0.20mm×0.5μm	Gasoline and diesel component analysis
01936-23002	Dedicated column for wine analysis	50m×0.25mm×0.5μm	Composition analysis of liquor and beer
05941-32002		30m×0.32mm×0.5μm	

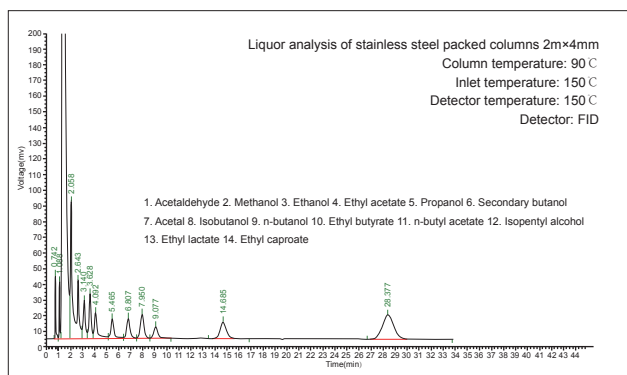
Analysis of Organochlorine Pesticide Residues



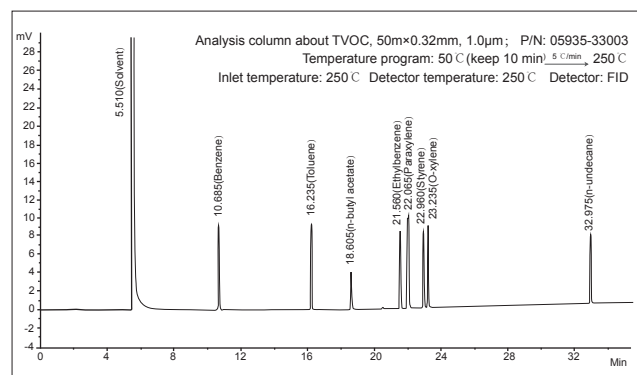
Analysis of Liquor



Analysis of Liquor 2



TVOC Analysis



WEL-PONA

- ▶ Dedicated column for analysis of complex hydrocarbon
- ▶ Polarity is similar to Petrocol DH, DB-Petro, HP-PONA column

WEL-PONA Ordering Information:

Specification	P/N
WEL-PONA, 50m×0.2mm×0.5μm	01936-13002

WM-TVOC

- ▶ Dedicated column, used for determination of total volatile organic compounds (TVOC) in indoor air

WM-TVOC Ordering information:

Specification	P/N
WM-TVOC, 40m×0.32mm×0.33μm	05935-30021

WM-PEG20M, WEL-PEG20M

- ▶ Polyethylene glycol column
- ▶ Bond and crosslink with strong polarity
- ▶ Recommended for fatty acids

WM-PEG20M,WEL-PEG20M Ordering Information

Specification	P/N	Specification	P/N
WM-PEG20M 15m×0.2mm×0.25μm	05918-11001	WM-PEG20M 50m×0.53mm×0.5μm	05918-53002
WM-PEG20M 15m×0.2mm×0.5μm	05918-11002	WM-PEG20M 60m×0.2mm×0.25μm	05918-14001
WM-PEG20M 15m×0.25mm×0.25μm	05918-21001	WM-PEG20M 60m×0.2mm×0.5μm	05918-14002
WM-PEG20M 15m×0.25mm×0.5μm	05918-21002	WM-PEG20M 60m×0.25mm×0.25mm	05918-24001
WM-PEG20M 15m×0.32mm×0.25μm	05918-31001	WM-PEG20M 60m×0.32mm×0.5μm	05918-34002
WM-PEG20M 30m×0.2mm×0.25μm	05918-12001	WEL-PEG20M 30m×0.25mm×0.25μm	01918-22001
WM-PEG20M 30m×0.2mm×0.5μm	05918-12002	WEL-PEG20M 30m×0.25mm×0.5μm	01918-22002
WM-PEG20M 30m×0.25mm×0.25μm	05918-22001	WEL-PEG20M 30m×0.25mm×1.0μm	01918-22003
WM-PEG20M 30m×0.25mm×0.5μm	05918-22002	WEL-PEG20M 50m×0.25mm×0.25μm	01918-23001
WM-PEG20M 30m×0.32mm×0.25μm	05918-32001	WEL-PEG20M 50m×0.25mm×0.5μm	01918-23002
WM-PEG20M 30m×0.32mm×0.5μm	05918-32002	WEL-PEG20M 50m×0.25mm×1.0μm	01918-23003
WM-PEG20M 50m×0.2mm×0.25μm	05918-13001	WEL-PEG20M 50m×0.25mm×0.4μm	01918-23022
WM-PEG20M 50m×0.2mm×0.5μm	05918-13002	WEL-PEG20M 60m×0.25mm×0.25μm	01918-24001
WM-PEG20M 50m×0.25mm×0.25μm	05918-23001	WEL-PEG20M 60m×0.25mm×0.5μm	01918-24002
WM-PEG20M 50m×0.25mm×0.5μm	05918-23002	WEL-PEG20M 30m×0.32mm×0.25μm	01918-32001
WM-PEG20M 50m×0.32mm×0.25μm	05918-33001	WEL-PEG20M 30m×0.32mm×0.5μm	01918-32002
WM-PEG20M 50m×0.32mm×0.5μm	05918-33002	WEL-PEG20M 30m×0.32mm×1.0μm	01918-32003

Dedicated column for 37 kinds of fatty acids

Specification	P/N
WM-CN100 100m×0.25mm×0.2μm	07965-25011

Dedicated column for liquor analysis column

Specification	P/N
30m×0.32mm×0.5μm	05941-32002

Column pharmaceutical ethanol analysis

Specification	P/N
30m×0.32mm×1.0μm	05941-32003-1

Dedicated column for alkyl mercury

Specification	P/N
15m×0.53mm×0.5μm	05971-51002

Column for organic phosphorus agricultural residue

Specification	P/N
30m×0.32mm×0.5μm	05939-32002

1.4 GC Packed Column

Stationary liquid: OV-1, OV-17, OV-101, OV-225, SE-30, SE-52, SE-54, PRG-400, PEG-600, PEG-1500, PEG-4000, PEG-6000, PEG-20M, DEGS, EGA, EGS, QF-1, FFAP, DNP, β, β- Diethoxyacetonitrile, silicone oil, apiezon, squalane, DC series and etc.

Support: Aiatomite (Chrosorb series and others), organic support

Adsorbent and polymer microspheres: Porapak series, Proasil series, GDX series, HDG series, SD series, molecular sieve, carbon molecular sieve, graphitized carbon black, silica gel, aluminium oxide, etc.

Specification: Inner diameter 2-4 mm, length: 0.5-9 m.

◇ Welch also offers custom-made GC packed columns. Please provide GC model number, column tube type, stationary phase composition, type and particle size of the solid support, inner diameter and length, and the targeted samples.

GC Packed Column Ordering Information:

- | Packing Materials | |
|------------------------------------|--|
| Support (e.g. Chromosorb WAW DMCS) | |
| Mesh Number | |
| Stationary Phase A | |
| Stationary Phase A Coated Amount/% | |
| Stationary Phase B | |
| Stationary Phase B Coated Amount/% | |
- | | |
|----------------|---|
| Tube materials | <input type="checkbox"/> Stainless Steel <input type="checkbox"/> Passivated stainless steel <input type="checkbox"/> Glass <input type="checkbox"/> PP |
|----------------|---|
- | | |
|--|--|
| Instrument Model (e.g. Agilent 7890A/ Shimadzu 2014 C) | |
|--|--|
- | Dimension | Note |
|--------------------|---|
| Length/m | |
| OD/mm | For Stainless Steel GC packed column, OD is required. |
| ID/mm | For glass packed column, ID is required |
| Center Distance/mm | For glass packed column, Center distance is required |

Note:

Before ordering a packed column, first verify that the GAS chromatograph instrument has a column inlet for injecting.

When ordering stainless steel packed column, please provide the instrument type and the outer diameter of the packed column.

When ordering glass packed column, please provide the instrument type and the center distance between the injector and the detector.

Application of GC Column

2.1 Application of GC Column in Chemical Energy Field

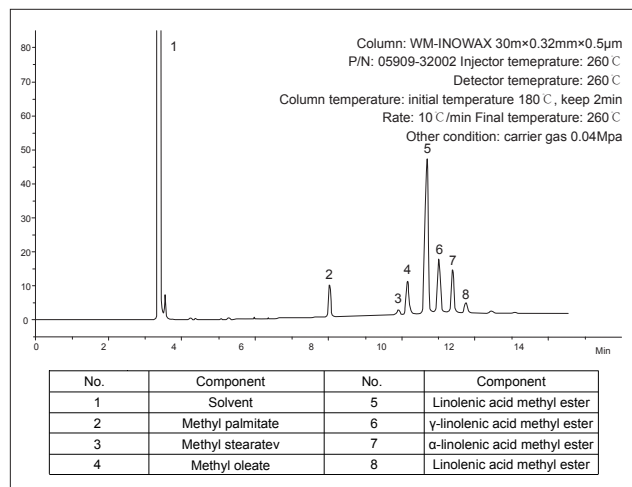
Analysis of high carbon fatty acid methyl ester by high temperature resistant crosslinked polar column

Characteristics: The high carbon fatty acid methyl ester can be analyzed to solve the difficulty of high temperature resistance of polar column. The maximum temperature of modified column can reach 320°C.

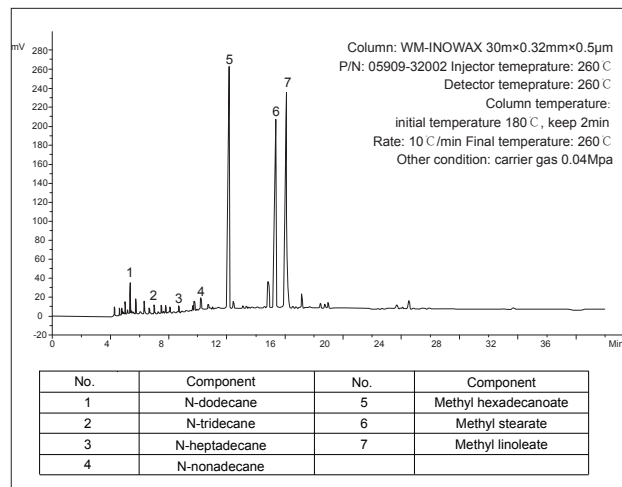
Analysis of Biodiesel on High-carbon Fatty Acid Methyl Ester Column

Characteristics: The high carbon fatty acid methyl ester in biodiesel was analyzed to solve the difficulty of high temperature resistance of polar column. The maximum temperature of modified column could reach 320°C.

High Temperature Resistant Crosslinked Polar Column



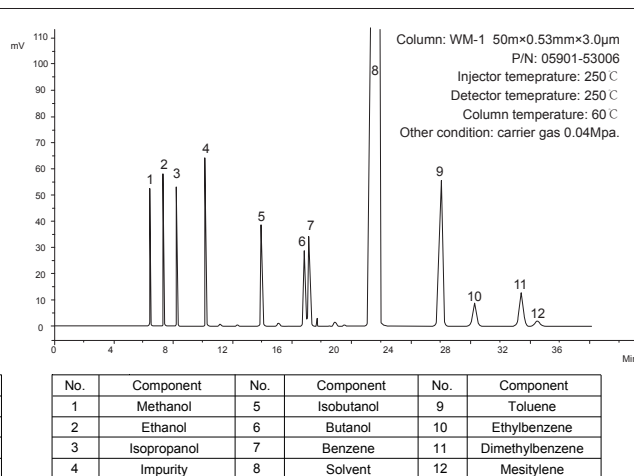
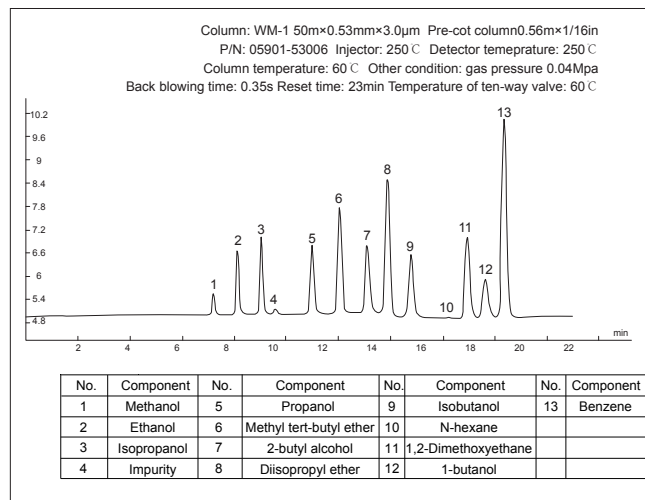
High-carbon Fatty Acid Methyl Ester Column



Analysis of Oxidation and Aromatics in Gasoline

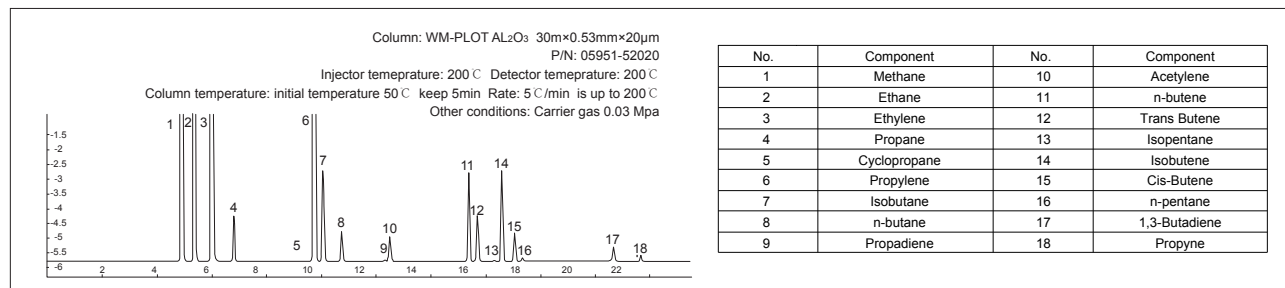
Characteristics: comply with SH/T 0663 analysis requirements for alcohols and ethers in gasoline

Characteristics: comply with SH/T 0693 aromatics analysis requirements in gasoline



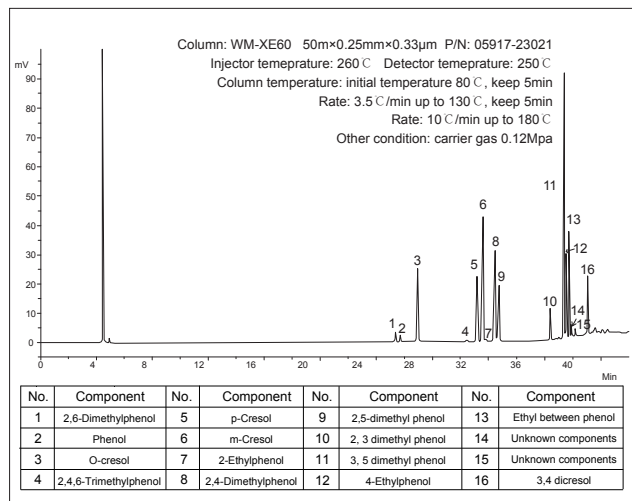
Chromatogram of Pyrolysis Gas Group Analyzed by Capillary Column

Characteristics: analyze C1-C7, the olefins are effectively separated from the olefins



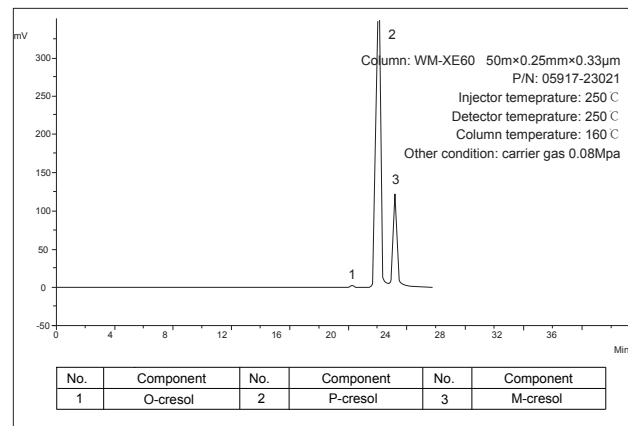
Analyze Industrial Phenols by Dedicated Column

Characteristics: analyze the components of phenolic products

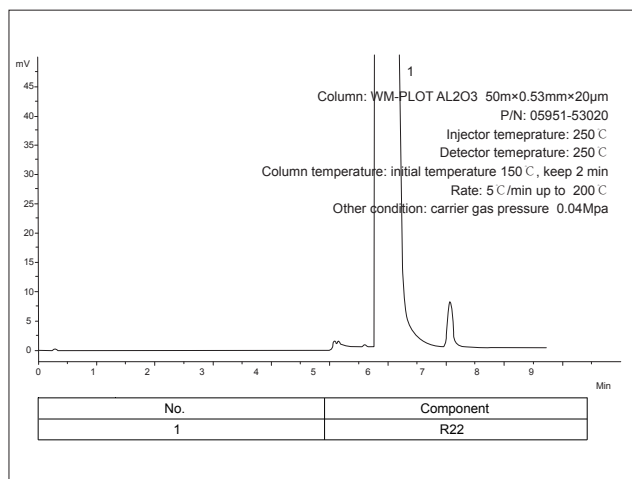


Analyze Purity of P-methoxyphenol by Phenolic Dedicated Column

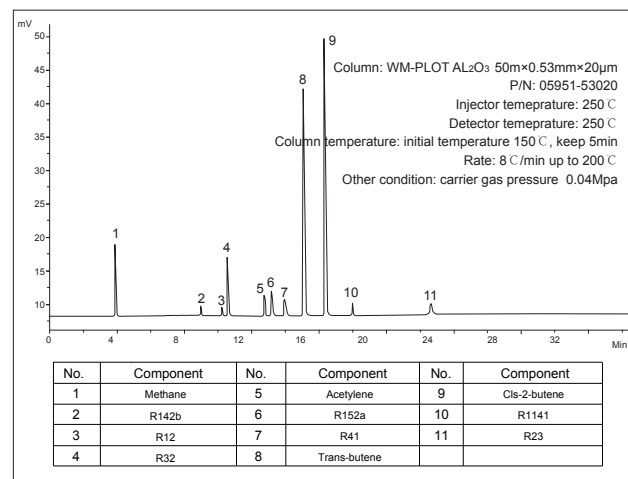
Characteristics: analyze purity of p-methyl phenol, and achieve baseline separation of o-methyl phenol, p-methyl phenol and m-methyl phenol.



Analyze Refrigerant R22 by Dedicated column

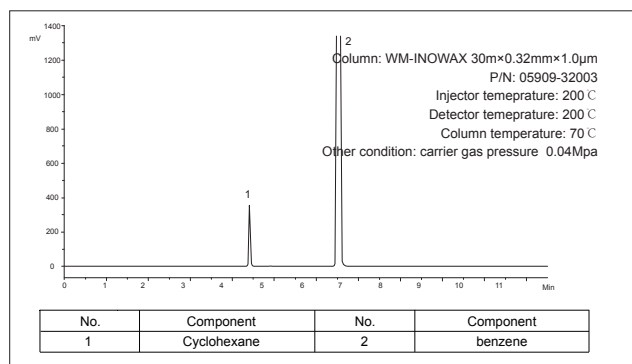


Analyze Mixed Gas Refrigerant by Dedicated Column

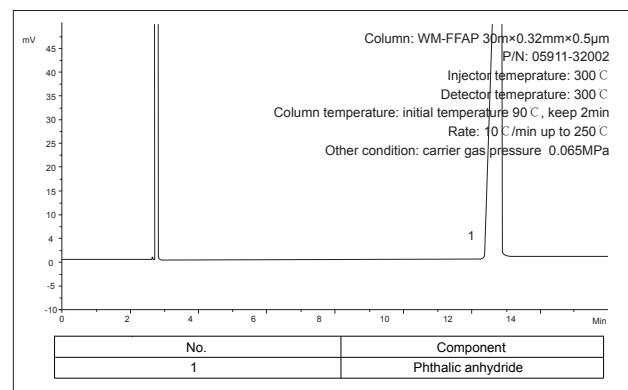


Analyze Cyclohexane and Benzene

Characteristics: effectively analyze of cyclohexane and benzene. It can be used to detect benzene or benzene in cyclohexane cyclohexane

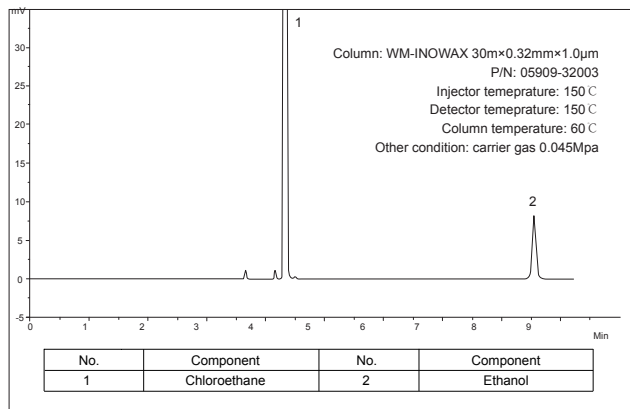


Analyze Purity of p-phthalic Anhydride by Dedicated Column in Chromatographic Way



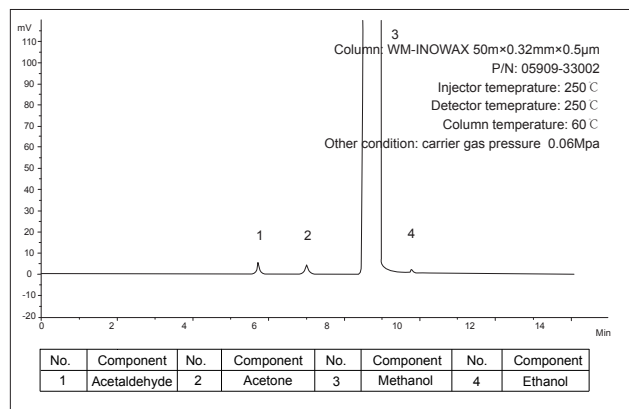
Analyze Chloroethane Purity by Capillary Column

Characteristics: analyze purity of chloroethane and the content of ethanol in chloroethane by capillary column



Analyze methanol purity by Capillary Column

Characteristics: if use capillary column to analyze the trace alcohol and related impurities in methanol, the methanol tailing would improve with good separation effect.

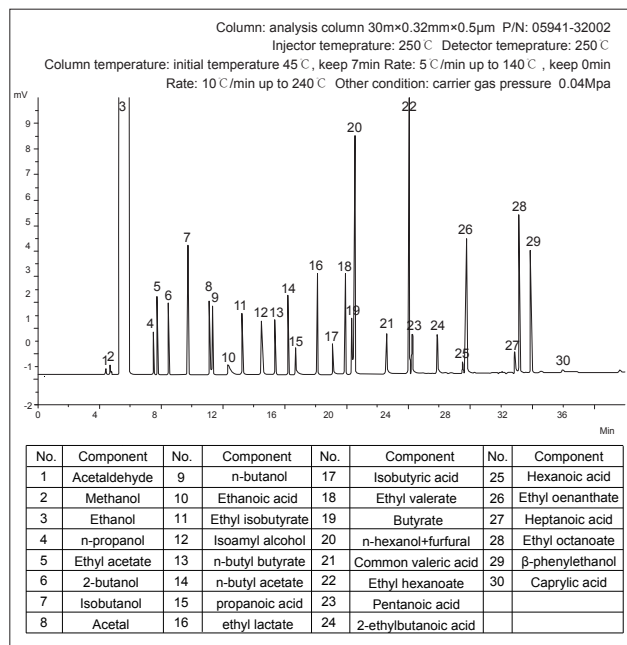


2.2 Application of GC Column in Brewing Field

Characteristics: in addition to alcohols and esters, organic acids, such as acetic acid, butyric acid and pentanoic acid can be well analyzed according to temperature programming. Baseline separation of methanol, acetaldehyde, ethanol and ethyl acetate can be achieved for temperature-programmed analysis of more components. More components also can be analyzed by temperature programming.

Liquor Capillary Column C1

C1 column can be used to analyze various mixed components of liquor, and there are up to 30 qualitative components at present.

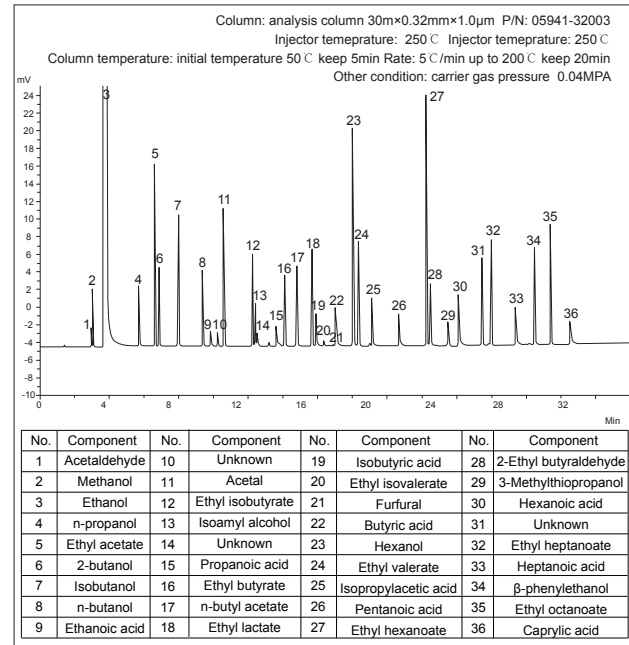


Analyze with Large Diameter Dediacted Column for Liquor

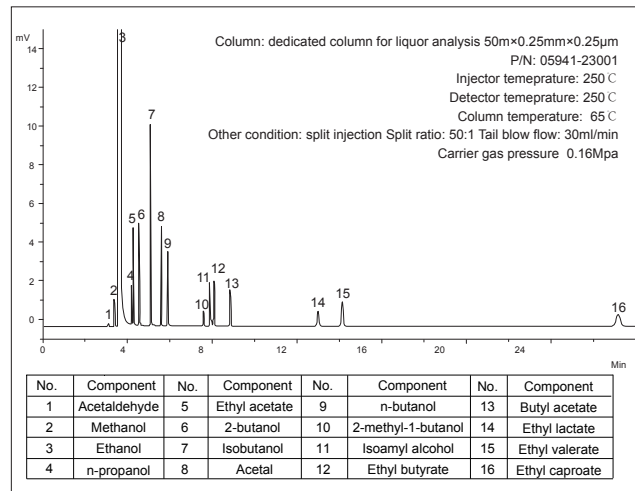
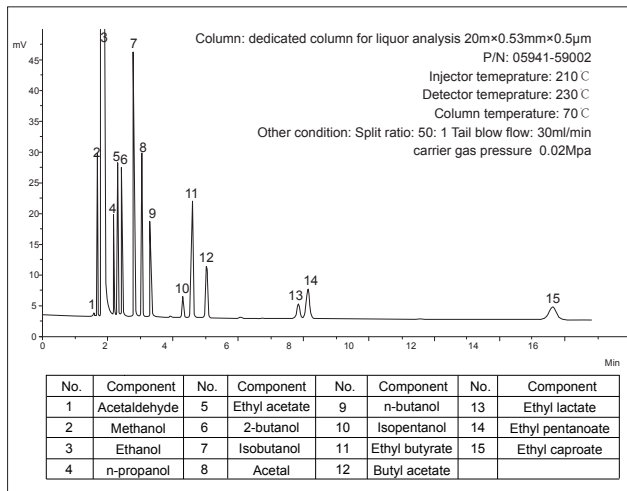
Characteristics: can be used for thermostatic analysis and completely separate methanol, acetaldehyde, ethyl acetate.

Liquor capillary column C2

C2 column has been upgraded on the basis of Liquor analysis C1 column, which can analyze more components such as 3-methiopropyl alcohol, n-hexanol, etc. Suitable for separation of acids. At present, there are 36 qualitative components

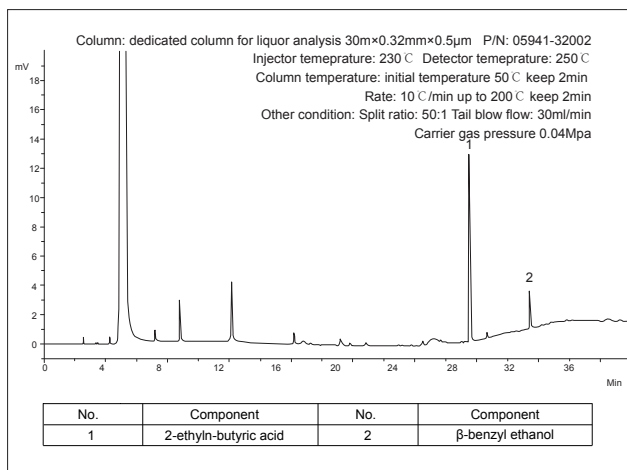


Constant temperature analysis of by Small Diameter Dediacted Column for Liquor



Analyze the Content of β -phenylethanol in Black Rice Wine

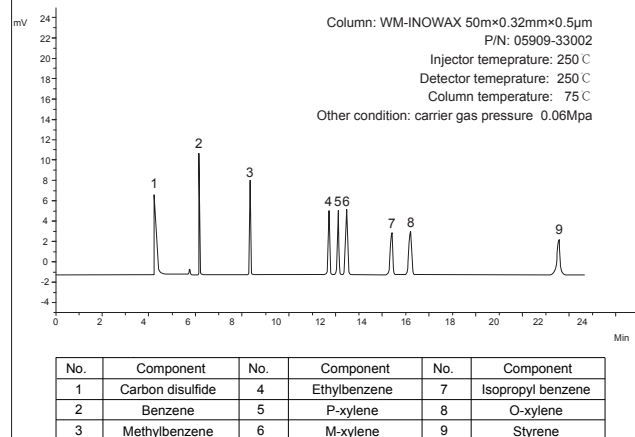
Characteristics: determine β -phenylethanol in black rice wine with 2-ethyln-butyrac acid as internal standard. This method can also be used for the analysis of other similar yellow rice wine products



2.3 Application of GC Columns in Environmental Analysis

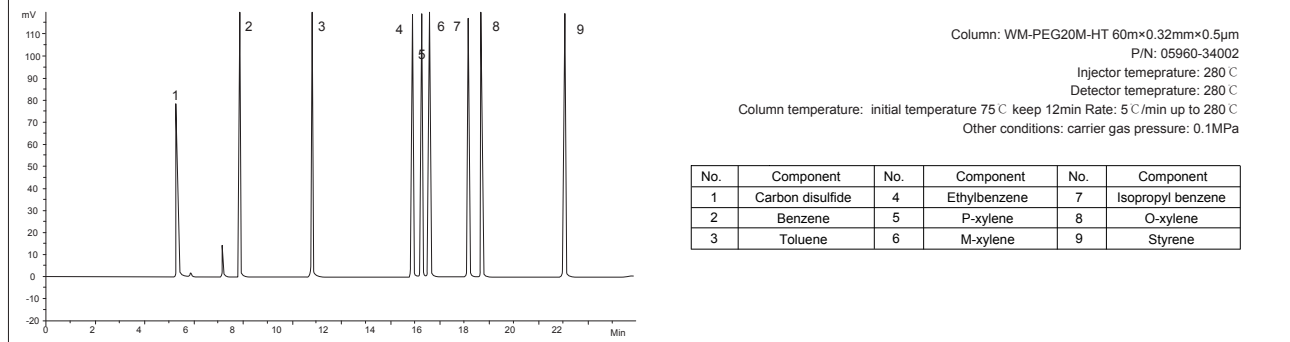
Separation of benzene series samples by capillary column

Characteristics: analyze eight kinds of benzene series samples



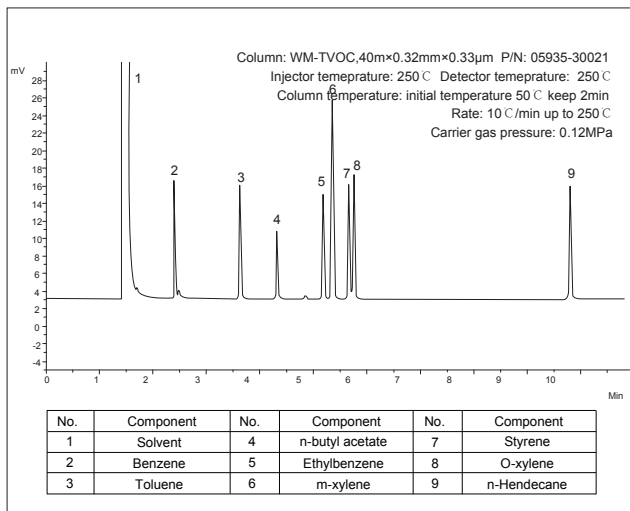
Analyze the Benzene Series Samples by High Temperature Resistant Capillary Column

Characteristics: comply with HJ 583/584 standards, analyze the maximum temperature of 8 benzene series samples up to 320 C, more durable than normal benzene column.



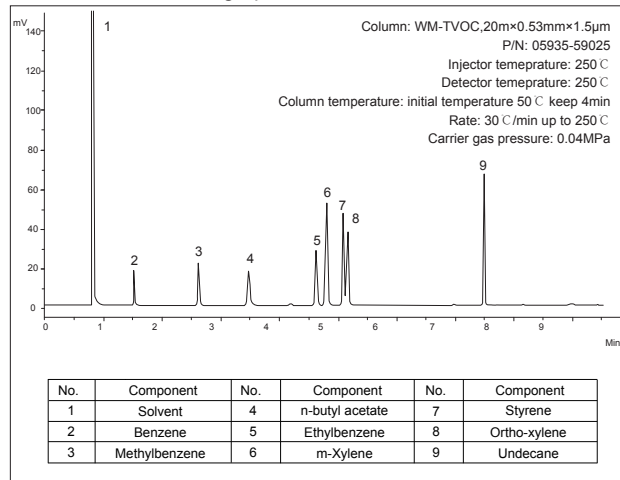
TVOC Column for Rapid Analysis

Characteristics: 8 kinds of volatile toxic and harmful substances in the indoor environment can achieve baseline separation within 10 min.



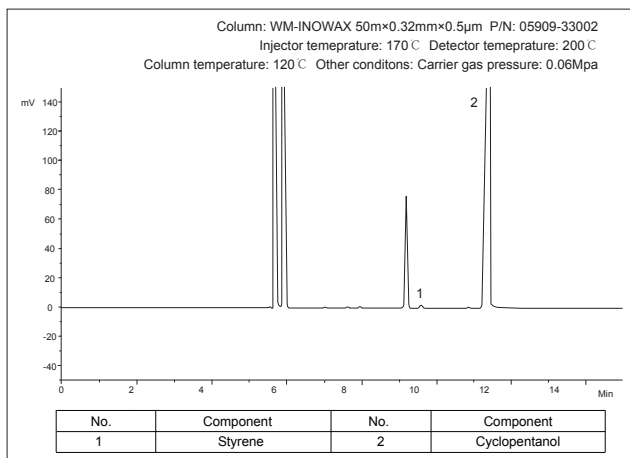
TVOC Special Capillary Column for Portable Micrometer

Characteristics: it can be used for portable miniature TVOC detector, which has the advantages of fast speed, good efficiency and convenient analytical conditions, etc., and is specially customized for miniature chromatograph



Residue Analysis of Styrene

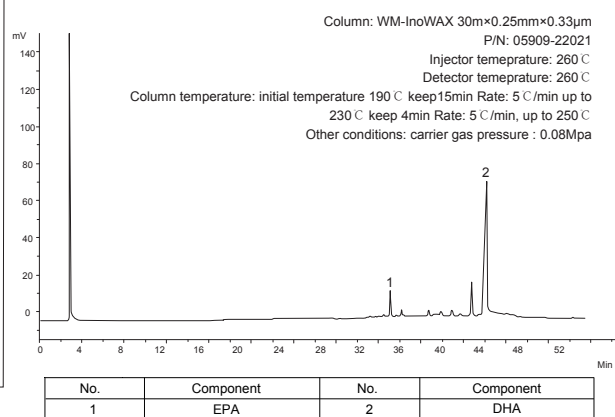
Characteristics: analyze the residue of styrene in polystyrene



2.4 Application of GC column in Food Field

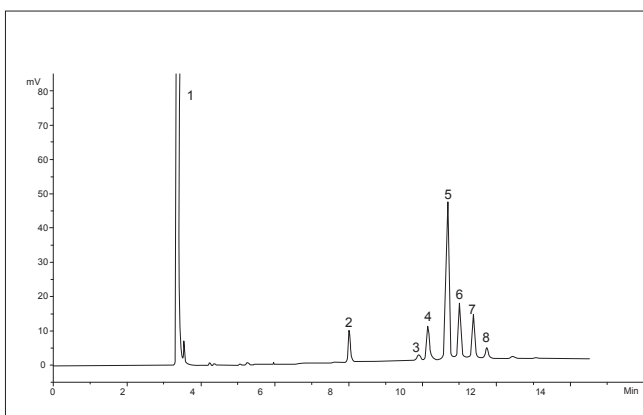
DHA, EPA Analysis

Characteristics: determine the content of DHA and EPA in fish oil by GC capillary column



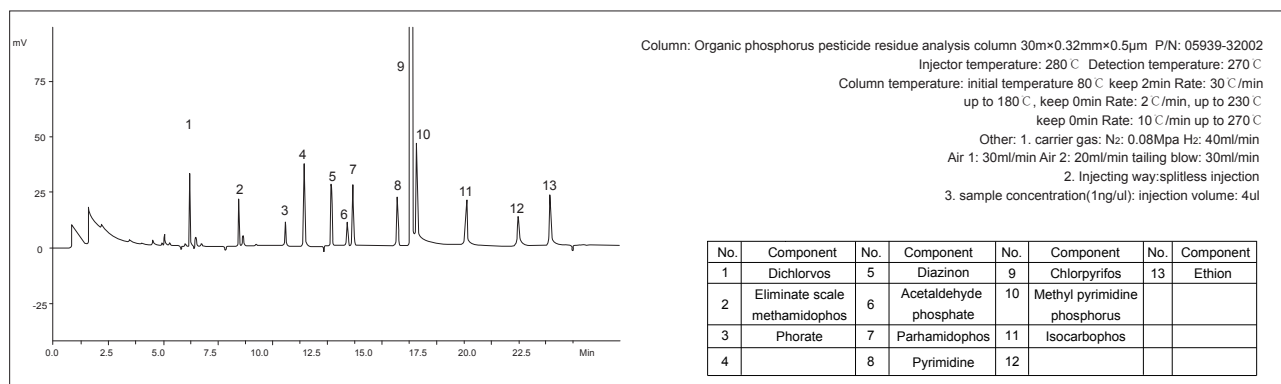
Analyze Fatty Acid Component

Characteristics: select GC capillary column to detect fatty acid components with good separation effect. The maximum temperature of the column can be up to 320 C



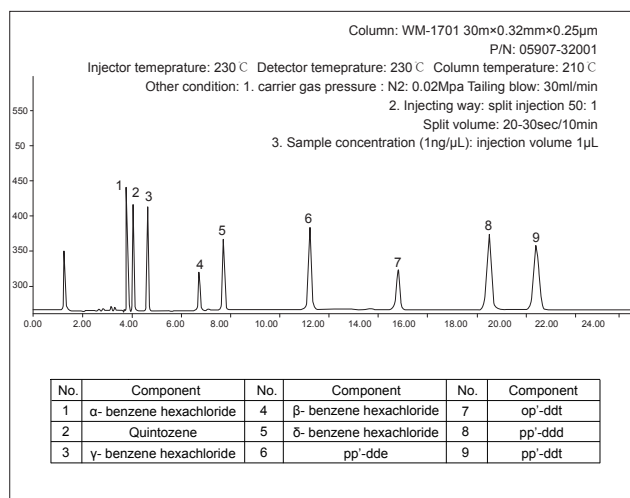
Analysis of Organophosphorus Pesticide Residues in Food

Characteristics: according to the pharmacopoeia, the content of menthol and camphor was detected by the capillary column



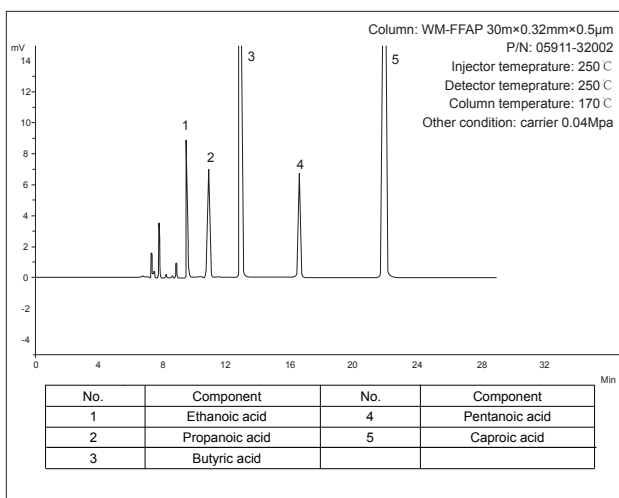
Analysis of Organochlorine Pesticide Residues in Food

Characteristics: constant temperature analysis of capillary column to achieve baseline separation benzene hexachloridex and DDT eight components

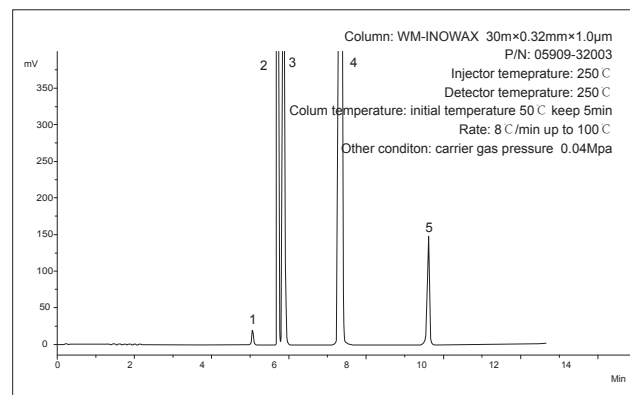


Chromatogram Analysis of C1-C6 Organic Acids

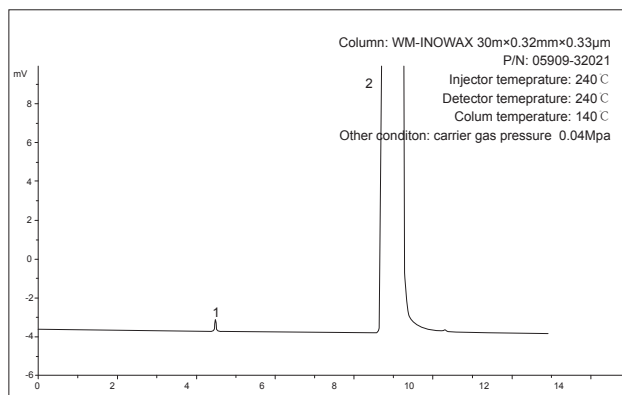
Characteristics: constant temperature analysis of capillary column to achieve baseline separation benzene hexachloridex and DDT eight components



Analysis of Formaldehyde, Methyl acetal, Methyl formate, Methanol and Methyl orthoformate



Analysis of n-Methylpyrazine Residue



No.	Component	No.	Component
1	Formaldehyde	4	Methanol
2	Methylal	5	Trimethyl orthoformate
3	Methyl formate		

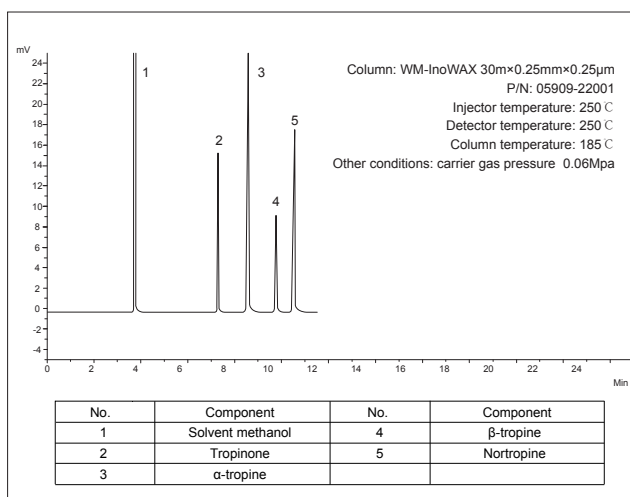
No.	Component	No.	Component
1	n-methylpyrazine	2	Dimethyl sulfoxide

2.5 Application of GC Column in Pharmacopoeia

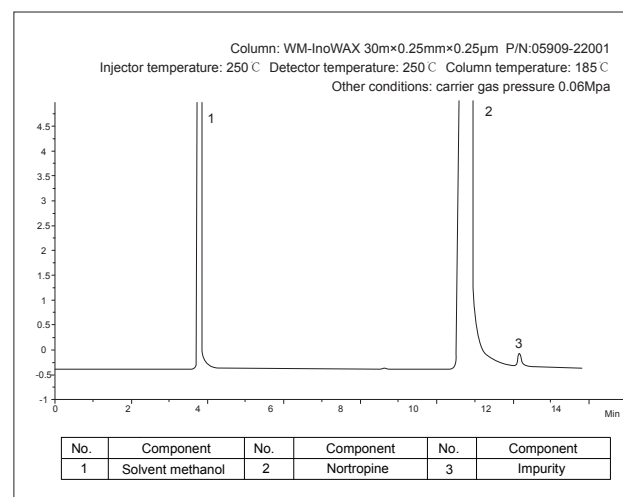
According to the provisions of the 2020 edition of Chinese Pharmacopoeia and the actual needs of customers, Welch specially launched the pharmacopoeia GC detection chromatogram atlas. Welch GC column perfectly conforms to the pharmacopoeia's requirements for column effect, resolution and tailing factor, etc., with good quality stability and excellent inter-batch reproducibility, which provides a strong guarantee for pharmaceutical enterprises to monitor drug quality.

Analysis of Tropine Mixed Samples

Characteristics: analyze the reactants of tropine in medicine

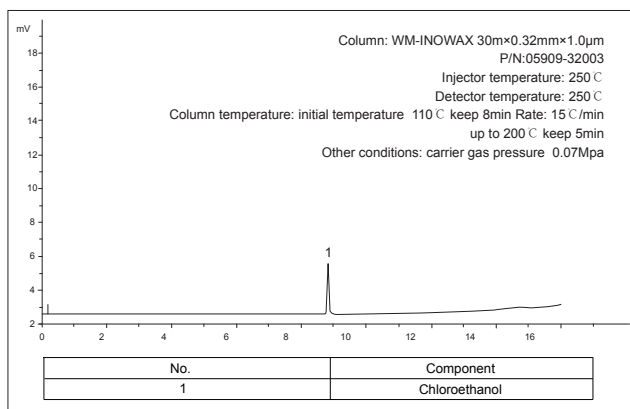


Analysis of the Purity of Nortropine



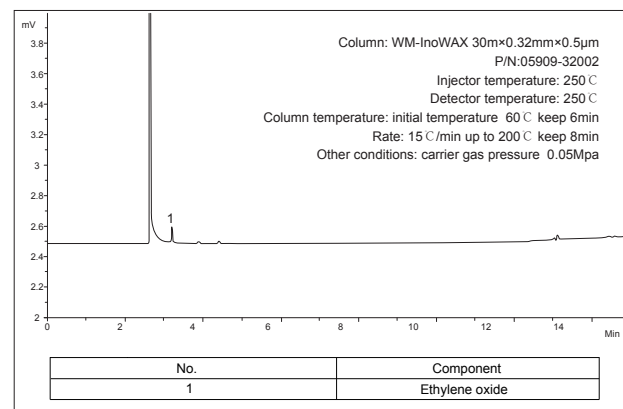
Analysis of Chloroethanol in Water

Characteristics: analyze the 2-chlorine ethanol residue in medical devices or hollow capsules in accordance with the pharmacopoeia, use water as solvent for direct injection analysis



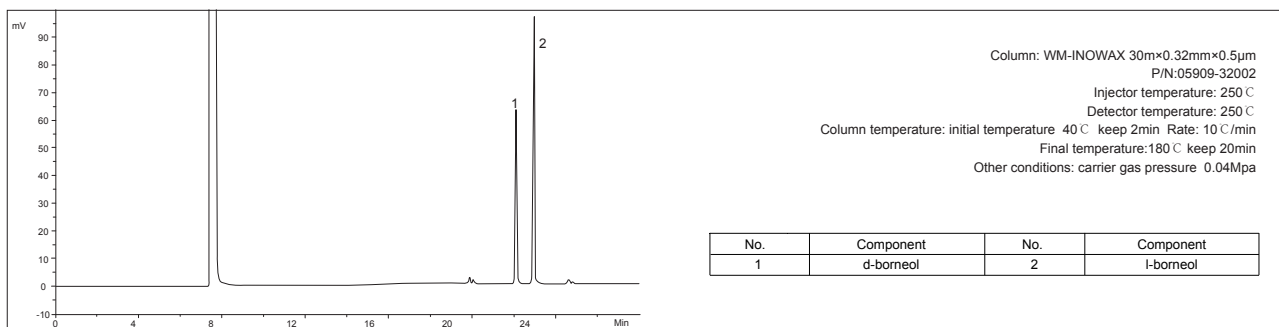
Analysis of Ethylene Oxide

Characteristics: Use headspace injection to analyze ethylene oxide residue in medical devices or hollow capsules. The column can also be used for 2-chloroethanol analysis



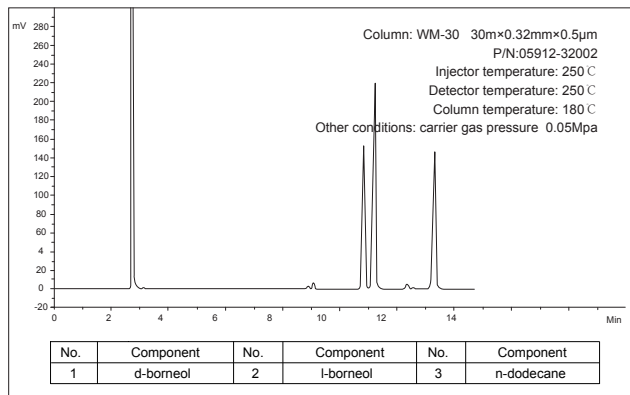
Analysis of Borneol Capillary Column 1

Characteristics: referring to the analysis requirements of natural borneol and synthetic borneol in the pharmacopoeia, select the capillary column specified in the pharmacopoeia to detect the content of isoborneol and borneol in borneol, and the analysis effect was better than that of packed column

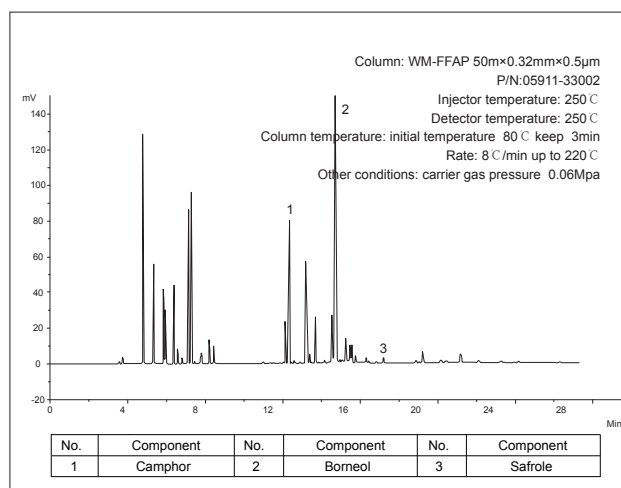


Analysis of Borneol by Capillary Column 1

Characteristics: to determine the contents of isobornol and borneol in borneol by capillary column, because this column has better analysis effect of the than that of the packed column and faster analysis speed than that of borneol capillary column 1

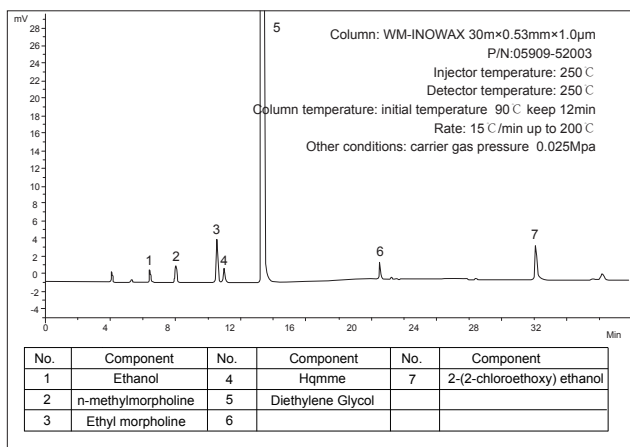


Analysis of Camphor, Camphor and Safrol in Essential Oil



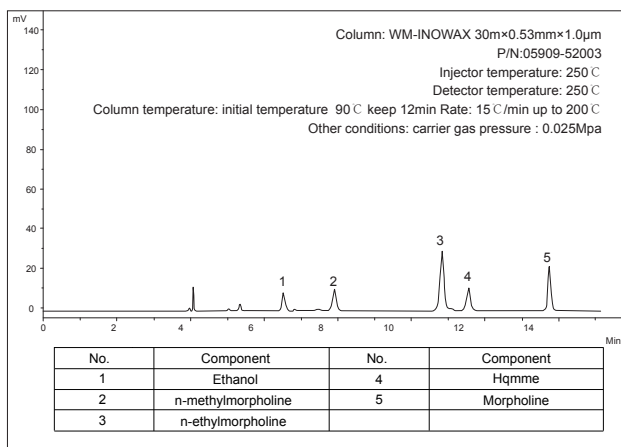
Analysis of Coarse Morpholine

Characteristics: the capillary column is suitable for detecting the purity of morpholine raw material and the composition of morpholine treated with dehydrogenation



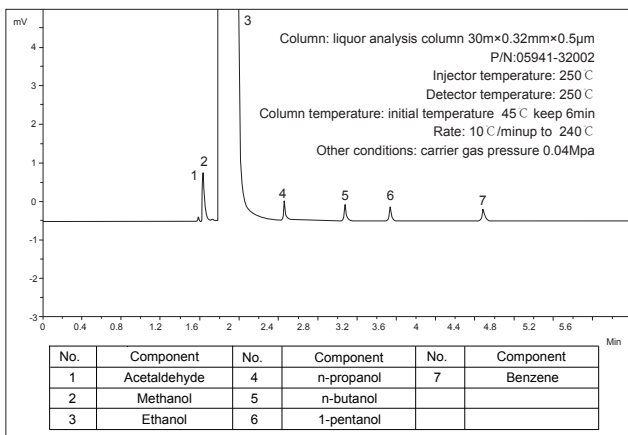
Analysis of Morpholine

Characteristics: The column can be used for analysis of related components of morpholine with good reproducibility and high resolution



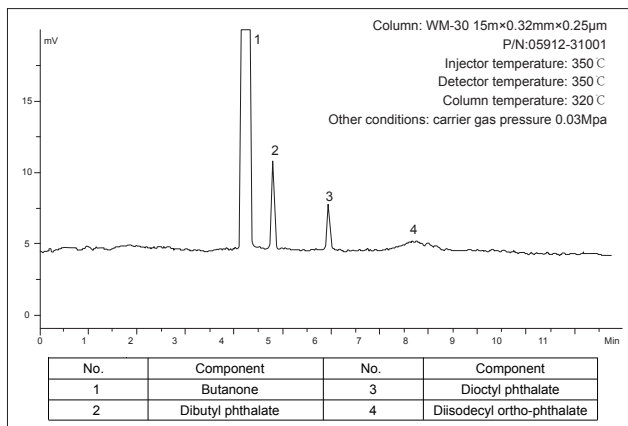
Determination of Ethanol Volatile Substance

Characteristics: according to the determination method requirements of volatile substances in the pharmacopoeia, select capillary column to test the purity of ethanol



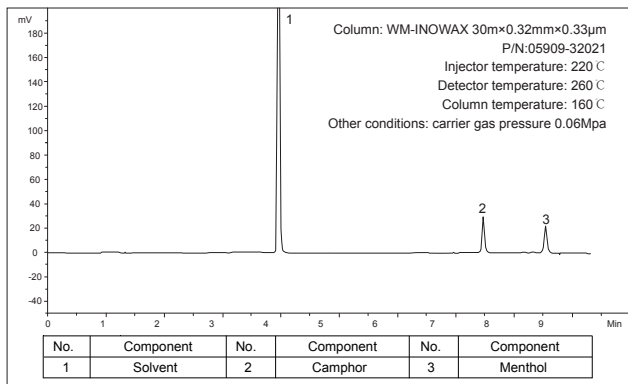
Analysis of Plasticizer

Characteristics: this capillary column is suitable for detecting the components of phthalate plasticizer in medical packaging



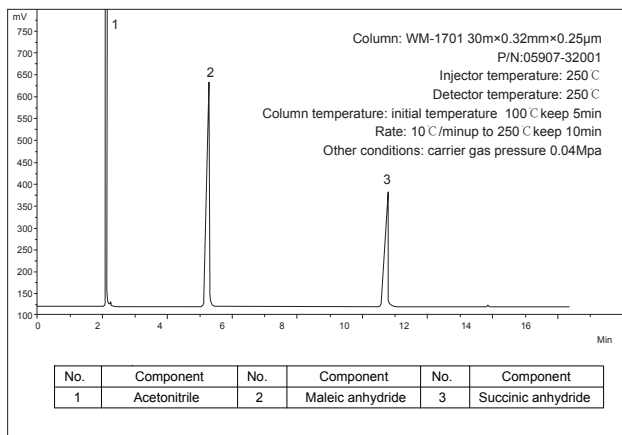
Analysis of Menthol Camphor

Characteristics: according to the pharmacopoeia, use the capillary column to detect menthol camphor content



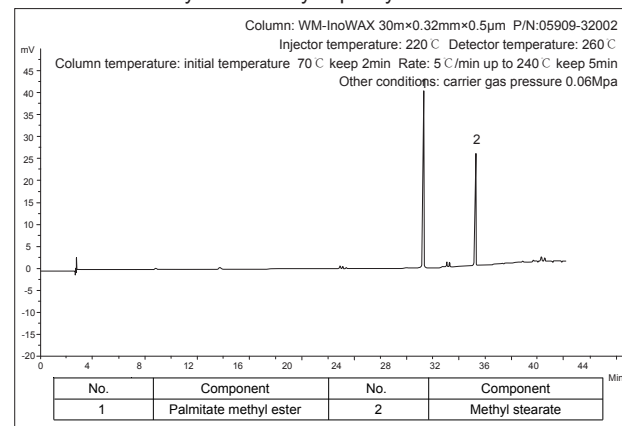
Analysis of Maleic Anhydride and Succinic Anhydride

Characteristics: the capillary column is suitable for the detection of maleic anhydride and succinic anhydride with high analytical accuracy and symmetry peak

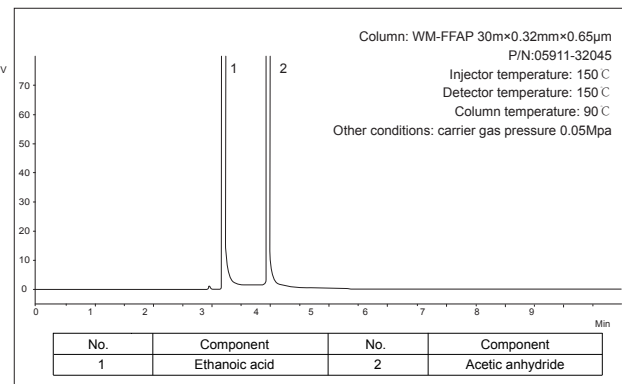


Analysis of Magnesium Stearate

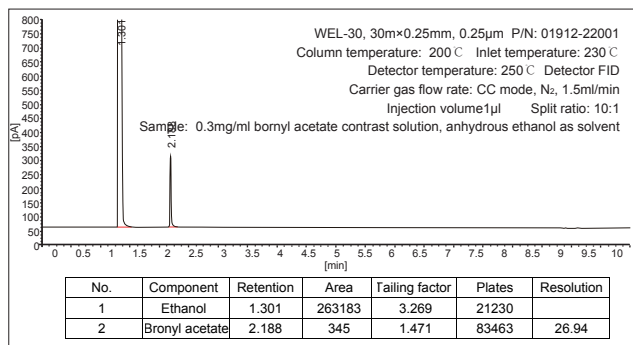
Characteristics: according to the requirement of magnesium stearate analysis in the pharmacopoeia, convert the magnesium stearate into methyl stearate by capillary column



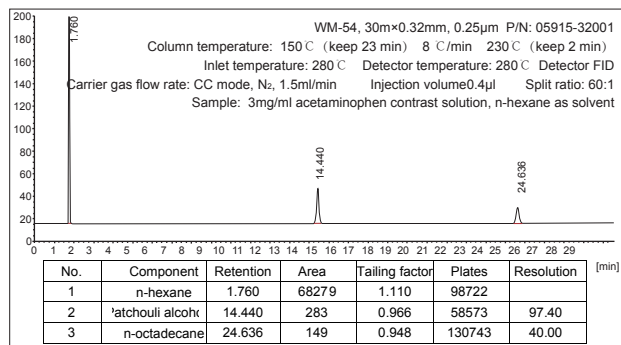
Separation of Acetic Acid and Acetic Anhydride by Capillary Column



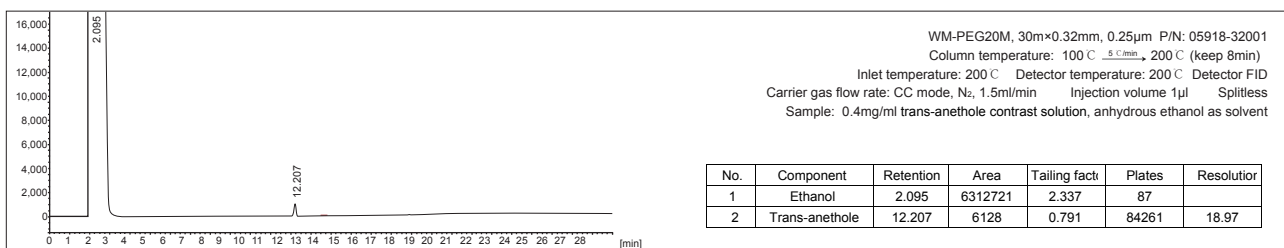
Amomum



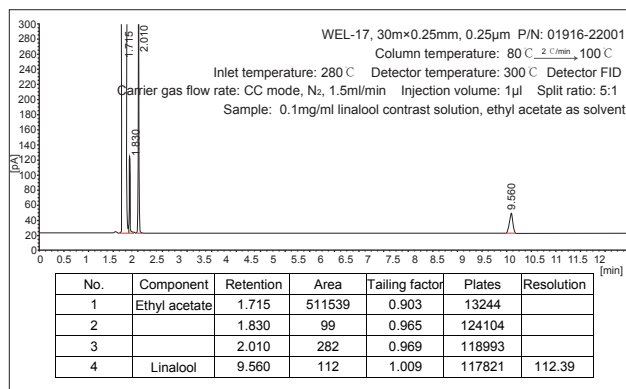
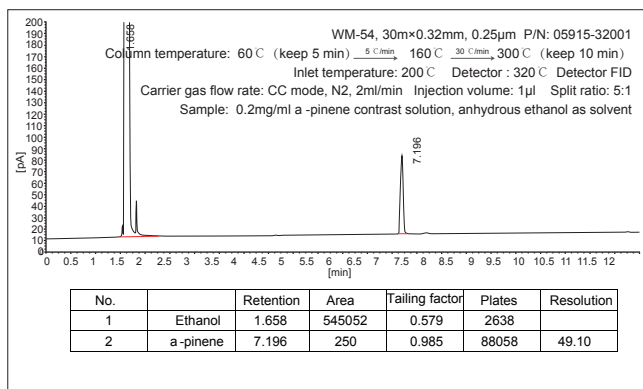
Pogostemon Cablin



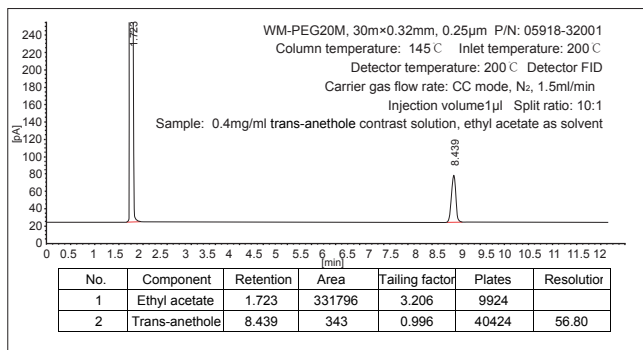
Fructus Anisi Stellati



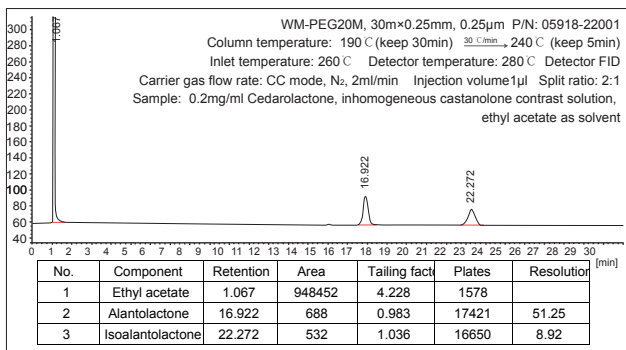
Pine Nodular Branch



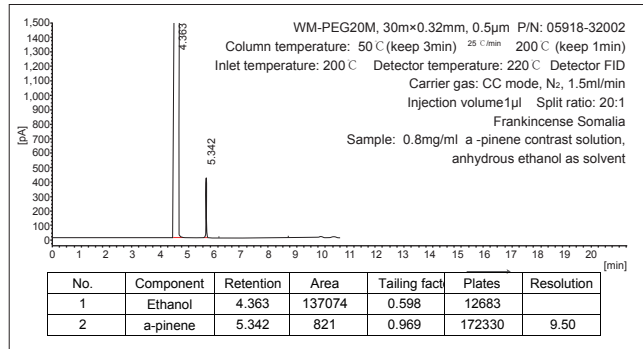
Fennel



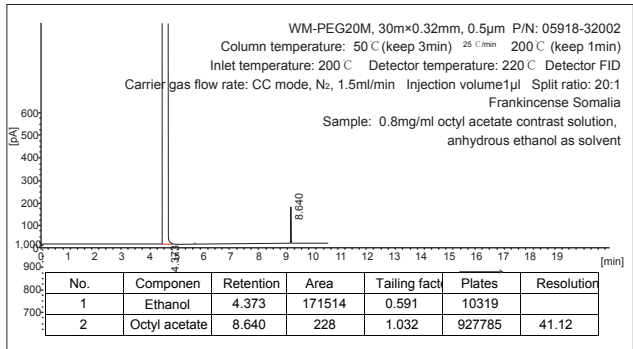
Elecampane



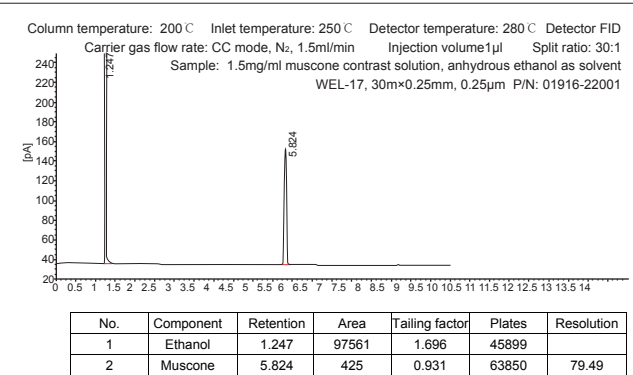
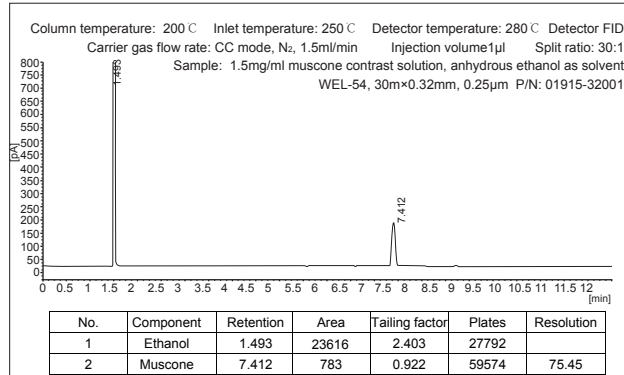
Frankincense Somalia



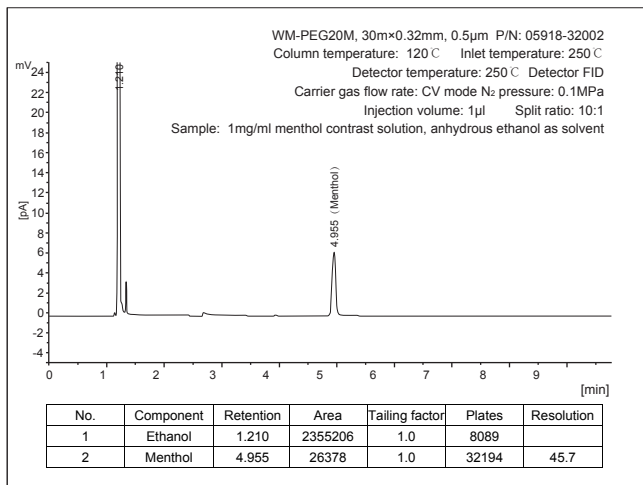
Ethiopian Frankincense



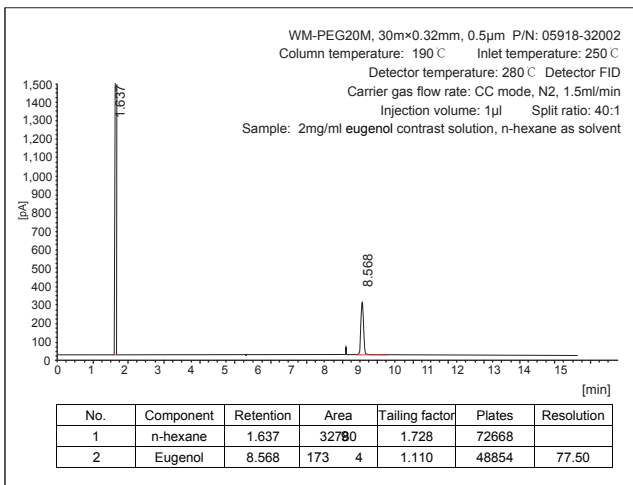
Moschus



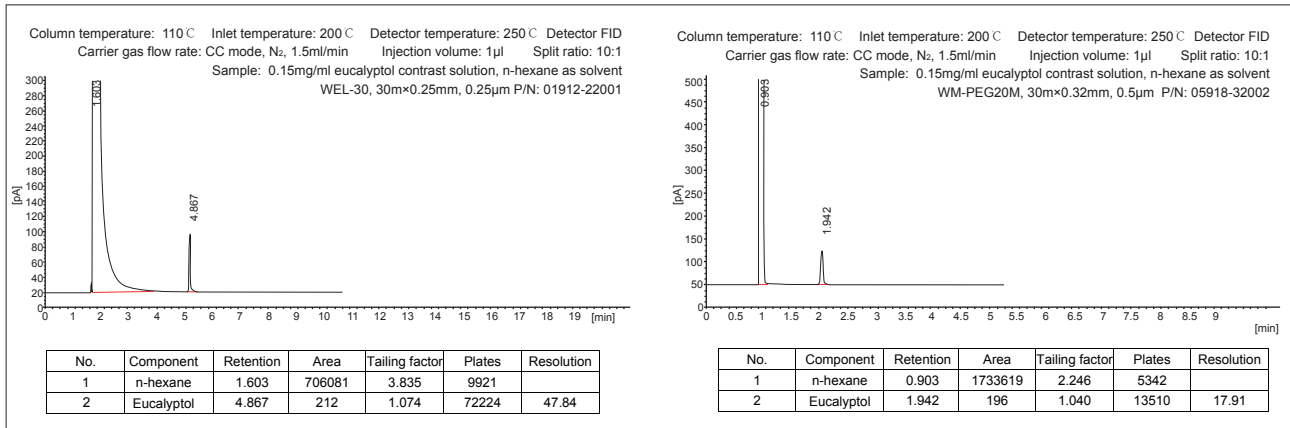
Menthol



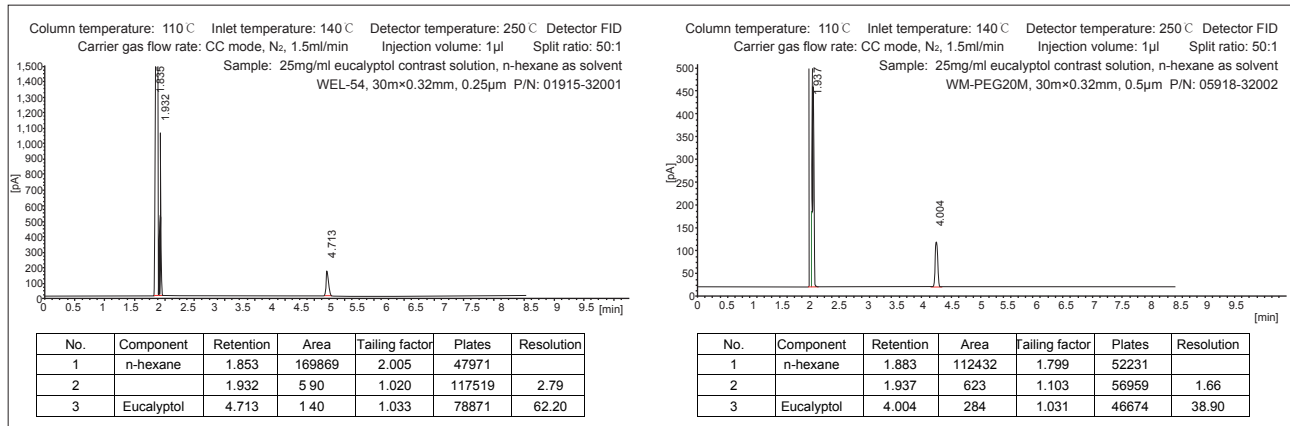
Cloves



Folium Artemisiae Argyi

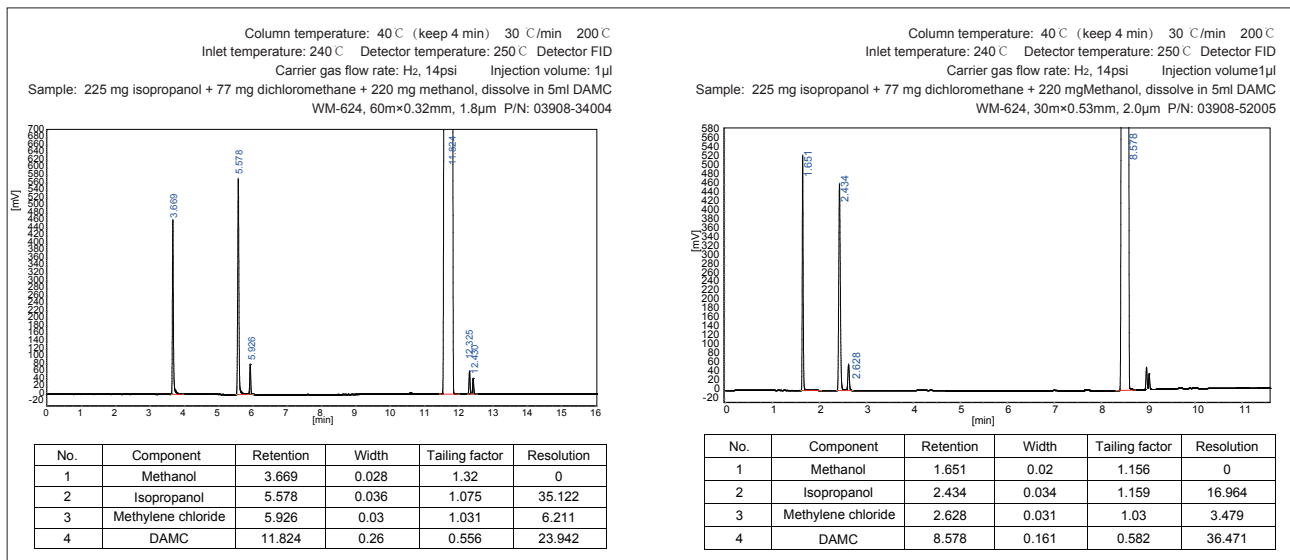


Nutmeg

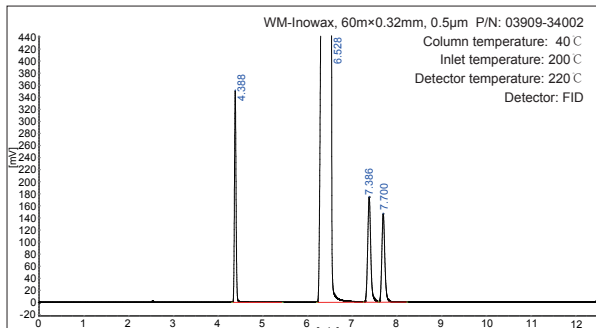


2.6 Other Applications of GC Columns

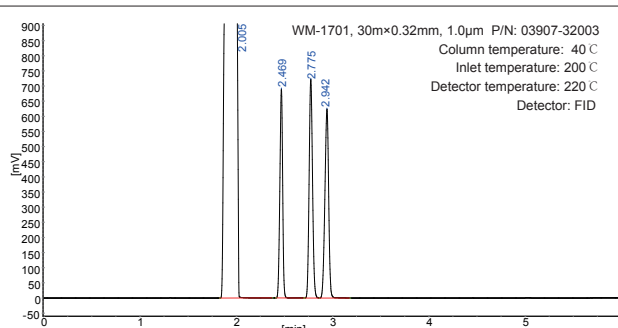
Amoxicillin Residual Solvent



Solvent Separation

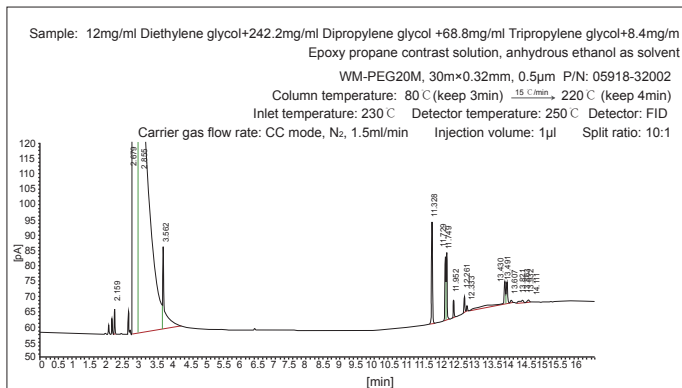


No.	Component	Retention	Half width	Tailing factor	Resolution
1	Acetone	4.388	0.036	1.1	0
2	Methanol	6.528	0.226	0.564	9.611
3	Isopropanol	7.386	0.067	1.14	3.445
4	Ethanol	7.7	0.066	1.185	2.787



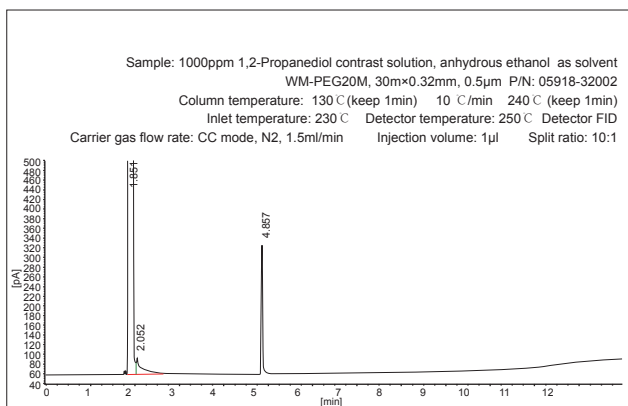
No.	Component	Retention	Half width	Tailing factor	Resolution
1	Methanol	2.005	0.145	0.559	0
2	Ethanol	2.469	0.029	0.929	3.135
3	Acetone	2.775	0.035	1.069	5.55
4	Isopropanol	2.942	0.039	0.943	2.625

Related Substance of Propanediol



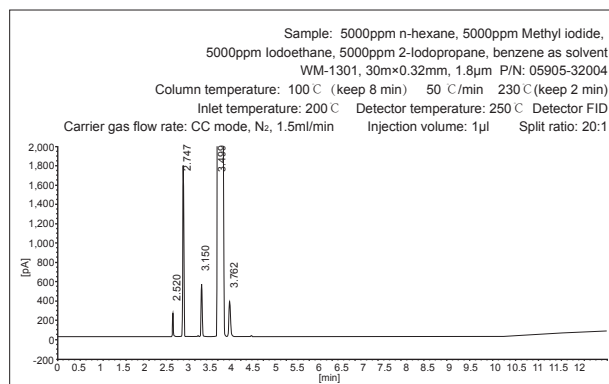
No.	Component	Retention	Area	Tailing factor	Plates	Resolution
1	Propylene oxide	2.159	8.7	1.148	98077	2.63
2	Anhydrous ethanol	2.679	613153.3	4.373	11402	1.09
3	Anhydrous ethanol	2.855	2025.5	7.041	1086	0.79
4	Impurity	3.562	124.8	3.782	57734	3.49
5	Dipropylene glycol	11.328	62.5	1.016	833078	103.00
6	Dipropylene glycol	11.712	37.6	1.056	992838	7.97
7	Dipropylene glycol	11.749	40.9	0.999	891837	0.78
8	Dipropylene glycol	11.952	10.5	1.027	938722	4.10
9	Dipropylene glycol	12.261	9.9	1.065	1020006	6.33
10	Diethylene glycol	12.333	3.5	0.945	1045708	1.50
11	Tripropylene glycol	13.430	44.9	0.528	506934	17.78
12	Tripropylene glycol	13.491	19.8	1.052	512213	0.81
13	Tripropylene glycol	13.607	3.8	1.027	279177	1.30
14	Tripropylene glycol	13.821	1.2	0.941	651177	2.50
15	Tripropylene glycol	13.863	1.1	1.046	778881	0.64
16	Tripropylene glycol	13.932	2.6	0.832	402300	0.93
17	Tripropylene glycol	14.110	2.3	0.988	577699	2.20

Content of propanediol



No.	Component	Retention	Area	Tailing factor	Plates	Resolution
1	Ethanol	1.851	477568	4.413	5583	0
2	Impurity 1	2.052	302	6.579	4496	1.82
3	Propanediol	4.857	539	1.195	153604	32.71

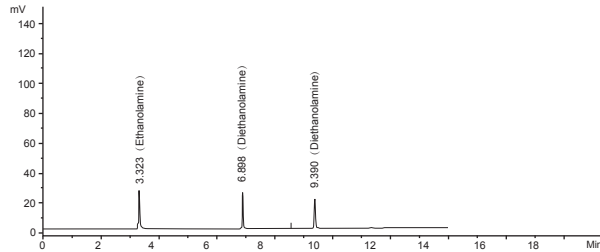
Methoxy, ethoxy



No.	Component	Retention	Area	Tailing factor	Plates	Resolution
1	Methyl iodide	2.520	297	1.039	95973	0
2	n-hexane	2.747	2674	1.043	75243	6.28
3	Iodoethane	3.150	911	1.039	80111	9.54
4	Benzene	3.499	582569	4.557	15313	4.44
5	2-Iodopropane	3.762	973	0.970	45821	2.87

Triethanolamine

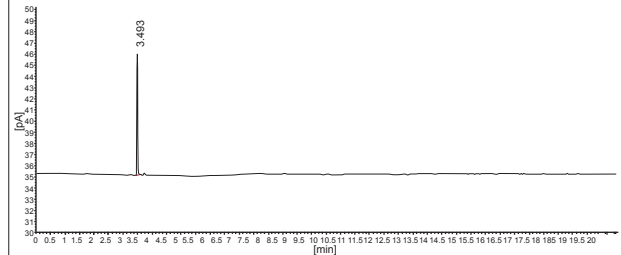
Sample: 2ul/ml ethanolamine, diethanolamine triethanolamine contrast solution, water as solvent
 WM-54, 30m×0.53mm, 3.0µm P/N: 05915-52006
 Column temperature: 60 C (keep 2min) 30 C/min 230 C (keep 10min)
 Inlet temperature: 250 C Detector temperature: 250 C Detector FID
 Carrier gas flow rate: CV mode N₂, 0.04MPa Injection volume: 1µl Split ratio: 50:1



No.	Component	Area	Area	Tailing factor	Plates	Resolution
1	Ethanolamine	3.323	81480	1.2	38242	0
2	Diethanolamine	6.898	54495	1.2	237269	57.5
3	Triethanolamine	9.390	61107	1.1	209097	36.0

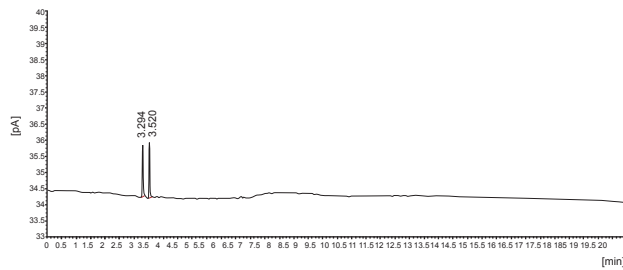
Epoxyethane and Dioxane in Polysorbate 80

Ethylene oxide as contrast substance 50ug/ml, water as solvent
 WM-1, 30m×0.53mm, 1.0µm P/N: 05901-52003
 Column temperature: 190 C Inlet temperature: 250 C Detector temperature: 280 C Detector FID
 Carrier gas flow rate: CC mode, N₂, 1.5ml/min Injection volume: 1µl Split ratio: 40:1



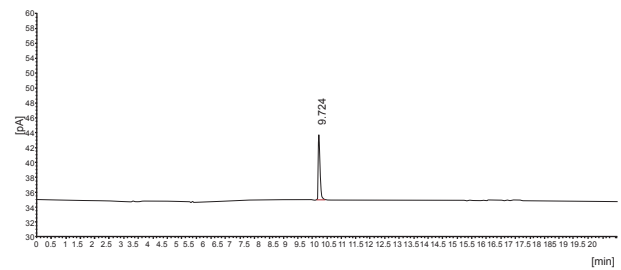
No.	Component	Retention	Area	Tailing factor	Plates	Resolution
1	Ethylene oxide	3.493	18.6	1.025	99784	

System Suitability



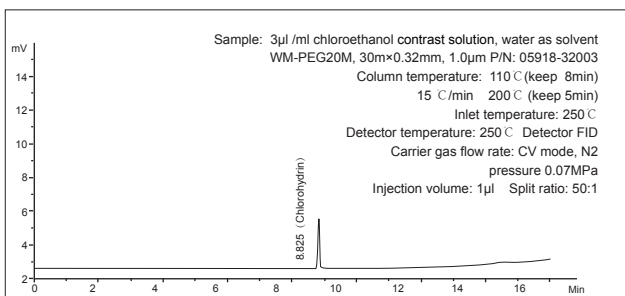
No.	Component	Retention	Area	Tailing factor	Plates	Resolution
1	Acetaldehyde	3.294	2.8	1.395	97748	
2	Ethylene oxide	3.520	3.2	1.297	97930	5.197

Dioxane 100ug/ml, water as solvent



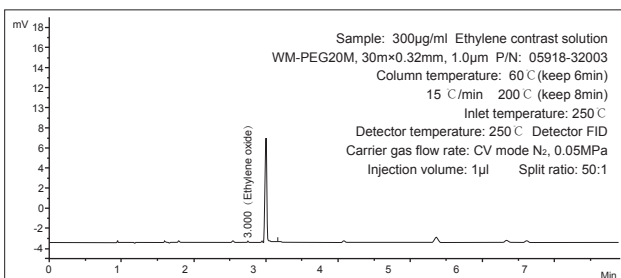
No.	Component	Retention	Area	Tailing factor	Plates	Resolution
1	Dioxane	9.724	38.4	1.400	121054	

Gelatin Hollow Capsules Containing Chloroethanol



No.	Component	Rt	Area	Tailing factor	Plates	Resolution
1	Chlorohydrin	8.825	10674	1.0	134364	

Gelatin Hollow capsules containing Ethylene oxide

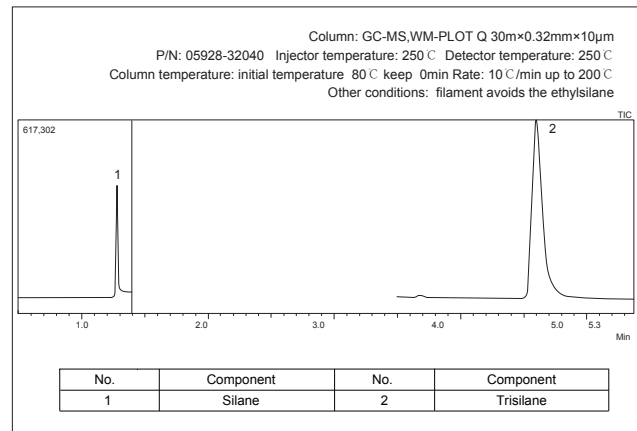
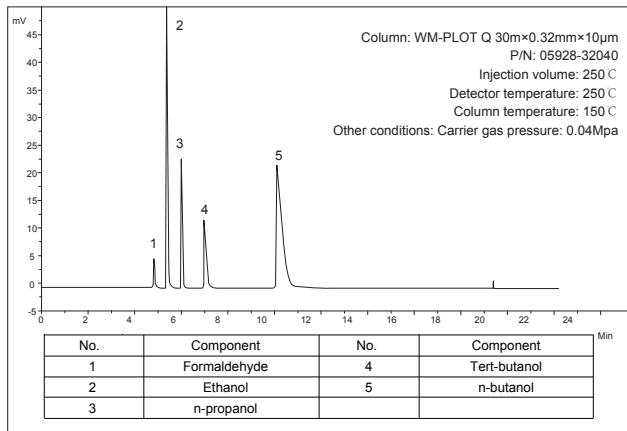


No.	Component	Rt	Area	Tailing factor	Plates	Resolution
1	Ethylene oxide	3.000	15185	1.0	91580	

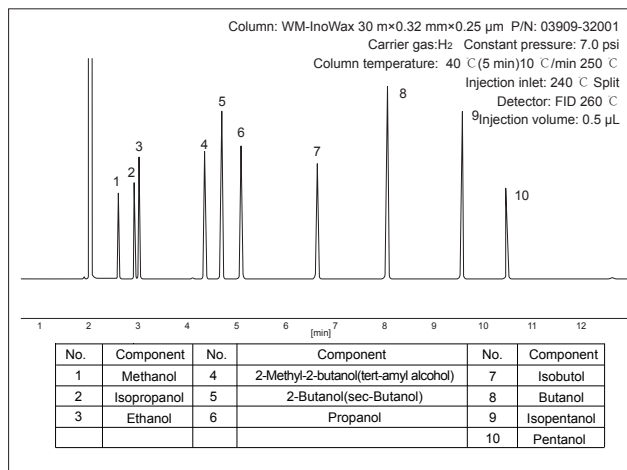
Analysis of Blood Alcohol by Capillary Column

Characteristics: according to the GA/T 842 blood alcohol test method, the capillary column detection of blood alcohol content can also be suitable for the analysis of large amounts of water trace alcohol components.

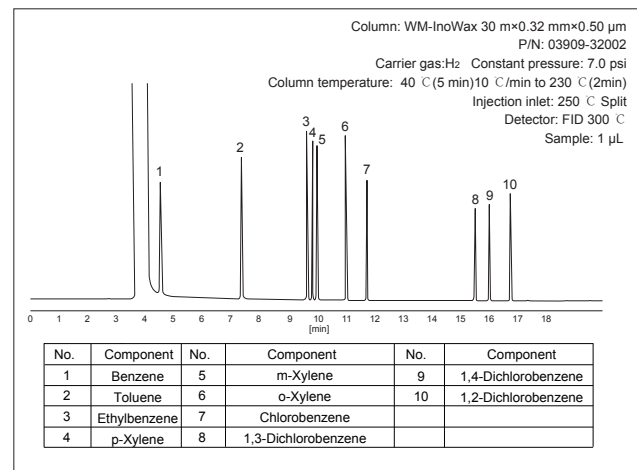
Analysis of Methylsilane and Propylsilane in Ethylsilane



Analysis of Alcohol Compounds

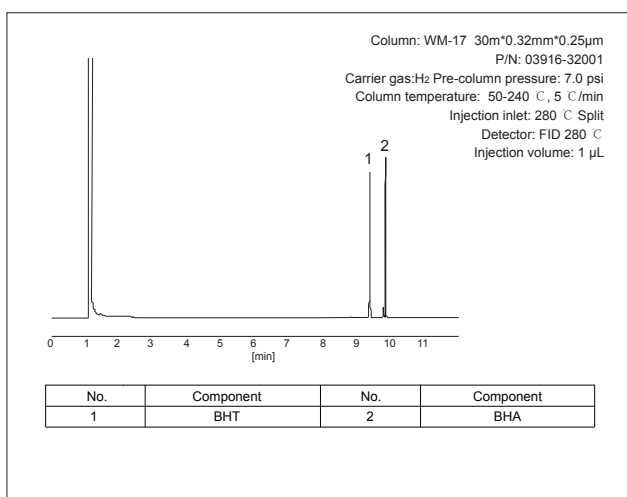


Aromatic Volatile Organic Compounds (EPA Method 507)

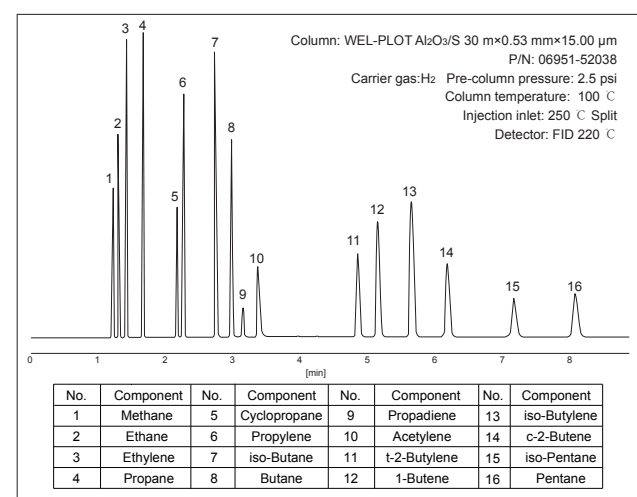


BHA (carcinogen, butylhydroxyanisole) and BHT (dibutyl hydroxytoluene)

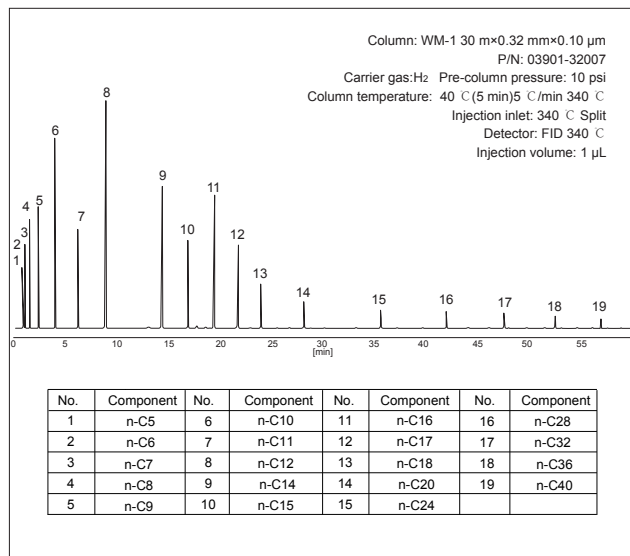
Characteristics: these two compounds have strong antioxidant ability and are often used as preservatives in food



C1-C5 hydrocarbons (analysis of hydrocarbons)

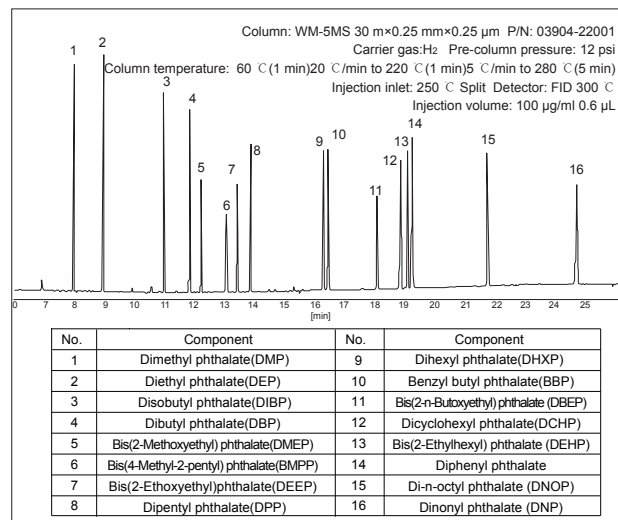


C5-C40 Hydrocarbons (Analysis of Hydrocarbons)



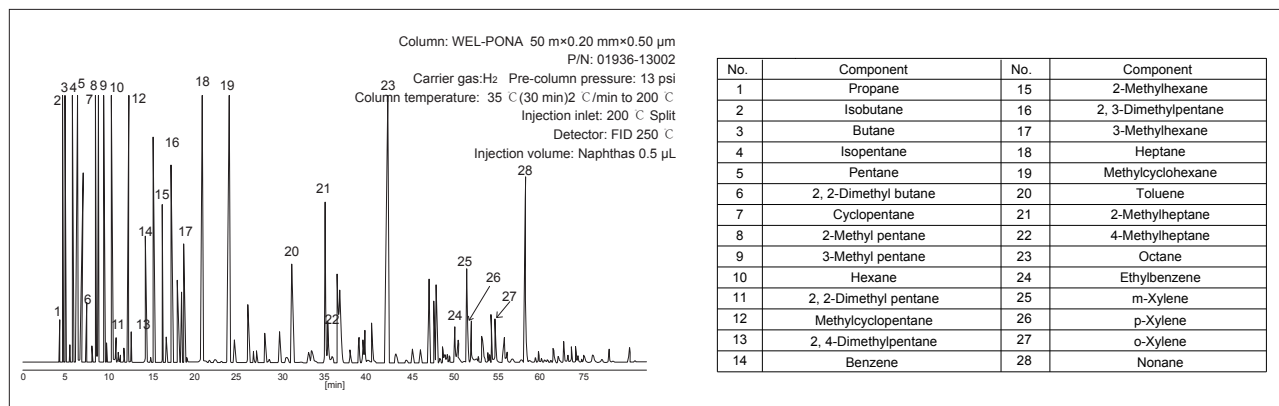
Analysis of Ester Compounds

(Dimethyl phthalate, diethyl phthalate, phthalate esters)

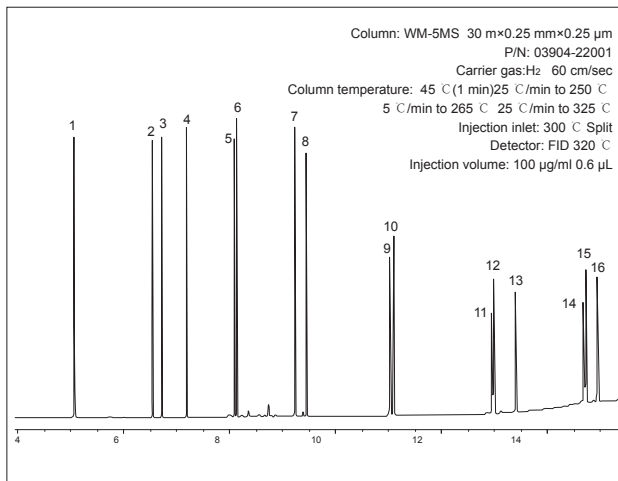
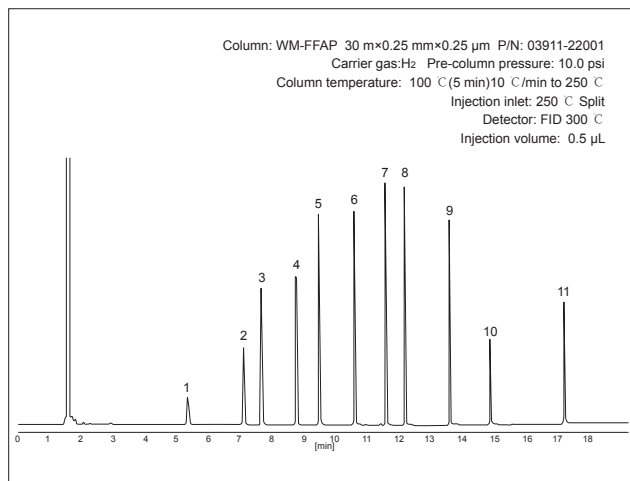


Naphthas Analysis

(Petroleum products, chemical light oil hydrocarbon compounds)



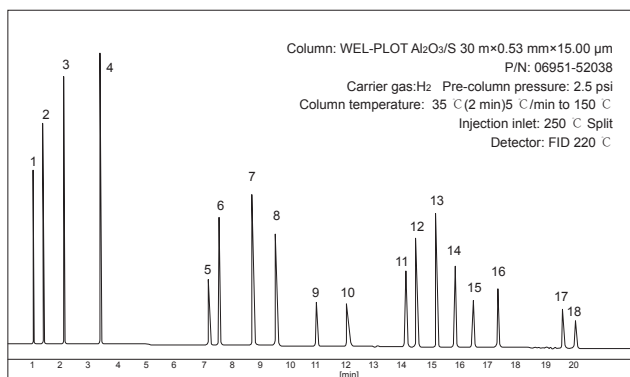
Organics Acids Determination of Small Molecular Organic Acids PAHS Determination of Polycyclic Aromatic Hydrocarbons



No.	Component	No.	Component	No.	Component	No.	Component
1	Acetic acid	4	Butyric acid	7	Isocaproic acid	10	Octanoic acid
2	Propionic acid	5	Isovaleric acid	8	Caproic acid	11	Decanoic acid
3	Isobutyric acid	6	Valeric acid	9	Heptanoic acid		

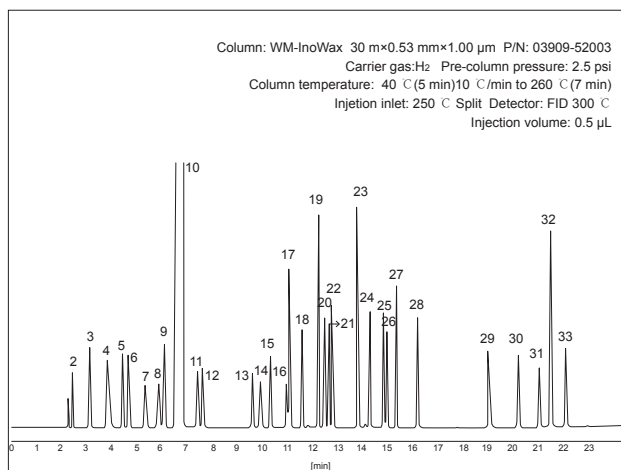
No.	Component	No.	Component
1	Naphthalene	9	Benz(a)anthracene
2	Acenaphthylene	10	Chrysene
3	Acenaphthene	11	Benzo(b)fluoranthene
4	Fluorene	12	Benzo(k)fluoranthene
5	Phenanthrene	13	Benzo(a)pyrene
6	Anthracene	14	Indeno(1, 2, 3-cd)pyrene
7	Fluoranthene	15	Dibenz(a, h)anthracene
8	Pyrene	16	Benzo(g, h, i)perylene

Determination of Refinery Gas



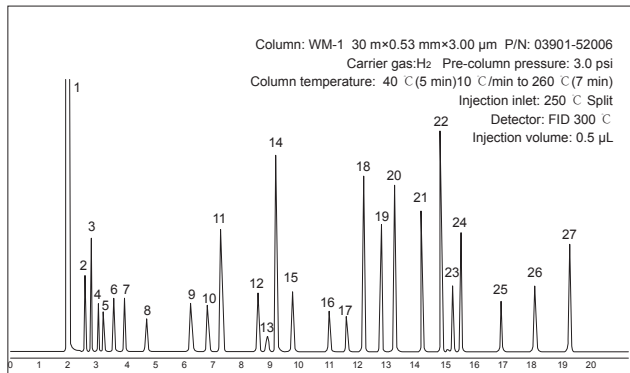
No.	Component	No.	Component	No.	Component	No.	Component
1	Methane	6	Propylene	11	t-2-Butylene	16	Pentane
2	Ethane	7	iso-Butane	12	1-Butene	17	1,3-Butadiene
3	Ethylene	8	Butane	13	iso-Butylene	18	Propyne
4	Propane	9	Propadiene	14	c-2-Butene		
5	Cyclopropane	10	Acetylene	15	iso-Pentane		

Solvent I Determination of Residual Solvent



No.	Component	No.	Component
1	Pentane	18	iso-Butanol
2	Hexane	19	iso-Amyl acetate
3	Cyclohexane	20	Ethylbenzene
4	Triethylamine	21	p-Xylene
5	Acetone	22	m-Xylene
6	Methyl acetate	23	o-Xylene
7	Tetrahydrofuran(THF)	24	Propylbenzene
8	Tetrachloromethane	25	tert-Butylbenzene
9	Ethyl acetate	26	Pentanol
10	Methanol	27	Phenylethylene
11	Methylene chloride	28	Cyclohexanone
12	Ethanol	29	Acetic acid
13	Acetonitrile	30	Benzaldehyde
14	Chloroform	31	DMSO(methyl sulfoxide)
15	Toluene	32	Ethylene glycol
16	1,4-Dioxane	33	Acetophenone
17	Butyl acetate		

Solvent II Analysis and Determination of Residual Solvent



No.	Component	No.	Component
1	Methanol	15	Triethylamine
2	Ethanol	16	Pyridine
3	Acetonitrile	17	N,N-dimethylformamide
4	Acetone	18	Toluene
5	Isopropanol	19	Dimethyl sulfoxide (DMSO)
6	Pentane	20	Butyl acetate
7	Methylene chloride	21	N, N-dimethylacetamide (DMAC)
8	Propanol	22	Ethylbenzene
9	sec-Butanol	23	Cyclohexanone
10	Chloroform	24	Phenylethylene
11	Tetrahydrofuran(THF)	25	Benzaldehyde
12	Butanol	26	tert-Butylbenzene
13	Tetrachloromethane	27	Acetophenone
14	Ethylene glycol		

Determination of Substituted Aniline Compounds

